PB81-900110

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GOVERNMENT REPORTS

Announcements & Index

10 May 8 1981

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GOVERNMENT REPORTS

Announcements & Index

Volume 81, Number 10 May 8, 1981

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* Committee on Scientific and Technical Information

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Subcategories: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles

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SAMPLE ENTRY

Field 12—MATHEMATICAL SCIENCES
Group 12A—Mathematics and Statistics
PB80-104045 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Constructed Facilities Div.
Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm,
E. Kausel, and G. Bouckovalas. Aug 79, 49p
R79-12, NSF/RA-79-12, NSF/RA-790206
Grant NSF-ENV77-18339

An efficient numerical procedure is presented for the computation of Hankel Transforms. The algorithm is based on the expression of the Hankel Transform in terms of a two-dimensional Fourier Transform, which is then reduced to only one dimension. The latter is then evaluated with the Fast Fourier Transform algorithm. Examples are presented, and a listing of the computer program included.

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NTIS Subcateogry
NTIS order number Availability/Price codes
Corporate or Performing Organization

Report title

Personal authors Report date Page count
Report number(s)
Contract or grant number(s)

Abstract

1. AERONAUTICS

1A. Aerodynamics

AD-A094 085/8 PC **A03**/MF **A01**
Purdue Univ., Lafayette, IN. School of Aeronautics and Astronautics.
Use of Strained Coordinate Perturbation Method in Transonic Aeroelastic Computations.
Final rept. Nov 79-Jun 80,
P. Guruswamy. Oct 80, 47p AFWAL-TR-80-3102
Grant AFOSR-78-3523

The application of the strained coordinate perturbation method in transonic aeroelastic computations is investigated. The main objective is to reduce the computational time required for transonic aeroelastic calculations. Based on the strained coordinate perturbation equations, a procedure is presented to generate steady state initial conditions for LTRAN2 transonic code. Influence of such initial conditions on unsteady computations is studied. Results are illustrated for Mach number, angle of attack and thickness variations. The computer time required by the present procedure and the direct LTRAN2 computations are compared. There is a considerable saving in the computer time by present procedure. The application of the strained coordinate perturbation method in computing transonic divergence speeds of a slender straight wing is presented. Results are obtained for a 10% thick parabolic arc at varying Mach number. Transonic divergence speeds obtained by present method are compared with those given by subsonic theory. A computer program for creating the steady state initial conditions based on the strained coordinate perturbation method is presented. This program is compatible with LTRAN2. (Author)

AD-A094 086/6 PC **A19**/MF **A01**
Advisory Group for Aerospace Research and Development, Neuilly-sur-Seine (France).
Subsonic/Transonic Configuration Aerodynamics.
Conference/Proceedings.
Sep 80, 449p Rept no. AGARD-CP-285
Presented at the Fluid Dynamics Panel Symposium, Munich (Germany, F.R.), 5-7 May 80.

Group 1A—Aerodynamics

An important region of the flight envelope of military aircraft is the transonic regime where fighter aircraft must undergo agile maneuvers, and airlift aircraft must cruise efficiently. Unfortunately it is a speed regime where wind tunnel testing is difficult, and numerical computations are not yet fully viable. Most troublesome is that exact configuration optimization criteria are lacking. Unavoidably the optimization procedure has been an ad hoc procedure, depending on the intuitive skills of the aerodynamicist. During the past decade, there has been significant progress in the development of transonic wind tunnel test techniques and computational methods. Employing these techniques, the aerodynamicist has developed many imaginative design concepts that have added to the optimization data base. It was the purpose of the symposium to review and assess these developments and project the future. Twenty nine papers comprised the meeting with three invited review papers. There was a relatively even mixture of theoretical and experimental papers with many providing test/theory comparisons. Subject matter ranged from simple wing-fuselage interference for both fighter and airlift configurations to those envolving additional components such as nacelle and pylons, powered jets, winglets, and most importantly stores and weapons.

AD-A094 203/7 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Aerospace Science and Technology News.
9 Dec 80, 9p Rept no. FTD-ID(RS)T-1553-80
Edited trans. of Hang K'ung Chih Shih (China) n3 p24-25 1978, by Randy Dorsey.

No abstract available.

AD-A094 438/9 PC **A07**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Systems Simulation and Development Directorate.
Turbulence Model Comparisons for Shear Layers and Axisymmetric Jets.
Technical rept.,
B. J. Walker. Oct 79, 132p DRSMI/RD-80-1-TR, AD-E950 074

Comparisons were made between experiment and theory to assess the capability of turbulent mixing models to predict the fluid flow-properties in the mixing region of both shear layers and jets. Jets exiting into both moving and quiescent streams were investigated. Attention was centered on two turbulence models: (i) k epsilon two and (ii) k omega prime. The same numerical flow field code was utilized with both turbulence models thus allowing a direct comparison of the turbulence models without fear of difference in the numerics masking the results. Results showed significant errors can be made when utilizing these models for prediction of shear flows of interest. The flow structure for these shear flows is in no way accounted for by the models and hence poor predictions result. It is felt the basic vortex structure will have to be modeled before significant improvement in the modeling will occur. (Author)

1B. Aeronautics

AD-A094 152/6 PC **A06**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Conflict Monitoring Analysis of Parallel Route Spacing in the High Altitude CONUS Airspace. Volume II.
Interim rept.,
Arthur P. Smith, III. Jul 80, 122p MTR-79W00235-VOL-2, FAA-EM-80-16-VOL-2
Contract DOT-FA80WA-4370
See also Volume 1, AD-A094 071.

The work reported in this document was undertaken as part of the examination of the soundness of the current standards for the spacing between parallel aircraft routes and the enhancement of analytical methods to evaluate future standards. This interim report describes work completed to date on the Conflict Monitoring Parallel Route Spacing Analysis. This analysis assesses the potential for collision and the controller workload associated with aircraft flying on same direction parallel routes. To assess the potential for collision the analysis considers a conflict alert function similar to that employed in the National Airspace System. The conflict alert function detects pairs of aircraft which are projected to violate the radar separation standard within a given time period. In the analysis, the event of a conflict alert is followed by a probabilistic delay and a resolution maneuver characterized by a randomly chosen horizontal turn rate. The controller intervention rate is estimated by using a simulation. Actual aircraft tracks were sampled from the FAA data base which supports this activity. These tracks are initiated on the routes based on randomly chosen sector entry times which reflect the level of route loading. For both the potential for collision and the intervention rate, trial results based on a subset of the FAA data are given.

PAT-APPL-6-090 205 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Arrestment System.
Patent Application,
Kenneth T. Koper. Filed 1 Nov 80, 25p AD-D008 027/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus and method for recovering and arresting an aircraft or other vehicle are described. A boom is swivelly connected to a support structure via braking mechanism. The boom is pivotally connected to the brake mechanism such that it can also pivot in a second, different plane intersecting the plane of rotation of the brake mechanism. A shear pin prevents pivoting of the boom in the second plane until the boom has experienced a predetermined load in that plane. The distal end of the boom distant from the brake mechanism is provided with structure for engaging the aircraft. When the aircraft is flown at and captured by the boom, the weight and motion of the aircraft breaks the shear pin, causing the boom to move in the second plane until engaged by a stop. This rapid change in position of the engaging end of the boom in the second plane prevents the aircraft from pendulating about the boom. Forward motion of the aircraft also causes movement within the brake mechanism in the first plane which absorbs the kinetic energy of the aircraft as the boom swivels against the brake mechanism, so that the aircraft is slowed and arrested. (Author)

PB80-910415 PC**$5.00**/MF**$5.00**
National Transportation Safety Board, Washington, DC. Bureau of Accident Investigation.
Aircraft Accident Report - Air Wisconsin, Inc., Swearingen SA-226 Metro, N650S, Valley, Nebraska, June 12, 1980.
9 Dec 80, 70p NTSB-AAR-80-15
Paper copy also available on subscription, North American Continent price $50.00/year; all others write for quote.

About 1546 c.d.t., on June 12, 1980, an Air Wisconsin, Inc., Swearingen SA-226 Metro, operating as Flight 965, crashed near Valley, Nebraska. Flight 965 encountered severe thunderstorms while at an altitude of less than 6,000 ft and experienced a simultaneous loss of power to both engines because of massive water ingestion. Although the engines were subsequently restarted the aircraft crashed in a field and was destroyed. Of the 15 persons aboard Flight 965, 13 were killed and 2 were injured seriously. These had been the thunderstorm activity in the vicinity of the accident site for several hours, and a severe storm warning had been issued for the Omaha area. The meteorologists in the Minneapolis Air Route Traffic Control Center (ARTCC) had alerted supervisory air traffic control personnel of the severity of the weather conditions; however, the information was not disseminated to the controllers or to the flightcrew of Flight 965. The National Transportation Safety Board determines that the probable cause of the accident was the flightcrew's continued flight into an area of severe thunderstorms, and the resultant precipitation induced flameout or loss of power of both engines at an altitude from which recovery could not be made.

PB81-143547 Not available NTIS
National Bureau of Standards, Washington, DC.
Survey Report--Altimeter Setting Indicators.
Sharrill D. Wood, and Charles R. Tilford. May 80, 17p
Pub. in Proceedings of the Air Data Systems Conference (1980) Held at the U.S. Air Force Academy, Colorado Springs, CO. on May 5-8, 1980, SRDS Tech. Letter Report No. RD-80-6-LR, 217p, 8 May 80.

The accurate altimetry required for landing approaches and terrain avoidance necessitates that reliable altimeter settings be available to compensate for changes in the local barometric pressure. The procedures and equipment used to provide altimeter settings and maintain their accuracy vary widely. In order to determine the accuracy actually found in the field a limited survey of altimeter setting indicators and some associated equipment was conducted at several locations. The results of that survey are presented.

PB81-802100 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Economic Analysis of Airline Operations. 1974-October, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1974-Oct 80.
Oct 80, 44p
Supersedes NTIS/PS-79/0931. Sponsored by National Technical Information Service, Springfield, VA.

These citations from the international literature concern economic analyses of all aspects of airline operations. Topics included are cost analysis studies, market research, financial management, cost reduction schemes, aircraft maintenance scheduling, and the relation of new technology to cost effective operation. (This updated bibliography contains 165 citations, 11 of which are new entries to the previous edition.)

1C. Aircraft

AD-A094 031/2 PC **A05**/MF **A01**
Arinc Research Corp., Annapolis, MD.
TMDE Modernization Program.
Technical rept. May-Dec 80,
A. Simmons, R. Kavanaugh, and B. Paiz. Jan 81, 86p Rept no. 1205-04-2-2368
Contract DAEA18-72-A-0005

Simplified analyses are carried out for the motions of a simple rigid two-bladed fully gimballed rectangular rotor rotating at constant speed about a stationary center point and about a center point translating at a low constant advance ratio. (The term 'fully gimballd' means that hub moments about all axes are zero.) It is concluded that: The rotor can be rendered dynamically stable by appropriate mass balancing. In a particular example considered, the mass balancing was estimated to increase the rotor weight by about 20%. The steady state motion about a translating center due to first harmonic moments induced by translation is a wobbling motion with the principal axis of rotation describing a cone about its mean position at twice the rotor rotational frequency. A circulation control system can control total rotor lift and can cause precession of the mean position of the principal rotational axis to any desired orientation. It cannot, however, influence the amplitude of the steady state wooble.

AD-A094 127/8 PC **A03**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Potential of Optical Fourier Analysis for Measuring Windscreen Distortion.
Technical rept.,
Herschel C. Self, and Harry L. Task. Dec 80, 34p Rept no. AFAMRL-TR-80-104

The potential of an optical Fourier technique for measuring the optical distortion of aircraft windscreens was examined. It was hypothesized that the compactness of the harmonics of the optical Fourier transforms of vertical and horizontal square wave targets photographed through windscreens would correlate highly with distortion in

photographs of a gridboard. Eleven transparent optical distortion panels were used to produce gridboard pictures and vertical and horizontal transform pictures. Gridboard pictures were subjectively ranked by 23 observers for amount of optical distortion. Transform pictures were ranked for compactness of the third harmonic. All three picture sets were also measured by subjective magnitude estimation. Rank correlation between gridboard photograph distortion ranks and compactness ranks for the vertical Fourier transform was .950. Overall rankings of gridboard distortion photographs and compactness rankings was .977. Such high statistically significant correlations show that distortion judgements from gridboard photographs is accurately predictable from judged compactness of the third harmonic. Thus, the Fourier method may be useful for measuring optical distortion. Development of objective methods to measure the compactness and to calibrate such measures against conventional measurements is warranted. This development would lead to a rapid, accurate and objective method for measuring the optical distortion of aircraft windscreens. (Author)

AD-A094 170/8 PC **A04**/MF **A01**
Goodrich (B. F.) Co., Akron, OH.
Aluminized Coding Study for Retrofitting In-Service Slide Materials.
Final rept.,
R. J. Cole, and G. S. Sims. Nov 80, 69p FAA-CT-81-151
Contract DOT-FA79NA-6065

This report describes the work to develop a thermal-resistant reflective coating for the retrofit of in-service slides and slide/rafts. The report includes the experimental evaluation of commercially available reflective coatings and paints, ingredient-modification experiments, methods of application, physical properties tests, and retrofit cost estimate. The end product of this study resulted in a new aluminum polyurethane coating, BF Goodrich coating KE7620, suitable for retrofit purposes. (Author)

AD-A094 172/4 PC **A05**/MF **A01**
Army Aviation Engineering Flight Activity, Edwards AFB, CA.
Preliminary Airworthiness Evaluation OH-58C Helicopter Configured with a Mast Mounted Sight.
Final rept. for period ending Oct 80,
John A. Bishop, Marvin L. Hanks, Tom P. Benson, and Arthur M. Arrigo. May 80, 76p Rept no. USAAEFA-78-09

The United States Army Aviation Engineering Flight Activity conducted a preliminary airworthiness evaluation of the OH-58C helicopter with a mast mounted sight and Bell Helicopter, Textron Model 570B three-axis stability and control augmentation system. The evaluation was completed in two phases at the Bell Helicopter Engineering Flight Research Center, Arlington, Texas (elevation 630 ft). Phase 1 consisted of an evaluation of a dummy mast mounted sight installed on an instrumented helicopter. This phase was conducted between 15 and 30 October 1980 and 12 flights were flown for a total of 9.7 productive hours. Phase 2 consisted of a qualitative assessment of the handling qualities of the OH-58C configured with the operational Rockwell International sight. This phase was completed on 30 November 1980 in two flights for 1.5 productive test flight hours. The overall evaluation indicated that the OH-58C handling qualities with installed mast mounted sight and three-axis SCAS were satisfactory within the flight envelope tested. No problems were noted that will prevent future operational testing of the system. The addition of a three-axis SCAS significantly improved the OH-58C handling qualities, particularly in low speed flight, and is an enhancing characteristic.

AD-A094 175/7 PC **A11**/MF **A01**
Boeing Vertol Co., Philadelphia, PA.
Helicopter Icing Review.
Final rept. 30 Sep 78-31 Jul 80,
A. A. Peterson, and L. U. Dadone. Sep 80, 249p D210-11583-1, FAA-CT-80-210
Contract DOT-FA78WA-4258

The development of techniques and criteria permitting the release of a helicopter into known (i.e., forecast) icing situations is actively being investigated by both military and civilian agencies through ongoing test programs and study efforts. As part of this overall effort, helicopter icing characteristics, available ice protection technology, and test techniques are discussed in this technical treatment. Recommendations are provided in the areas of icing certification procedures and icing research. One of the key issues addressed in this report is the test environment, i.e., the use of in-flight evaluation in natural icing only, or, the use of a simulated icing environment to supplement and/or expand the certification envelope. Involved in this issue is the shape (and extent) of the rotor ice (natural vs simulated) as it affects the aerodynamics and dynamics of the rotor system, together with the shedding characteristics as it affects the behavior and safety of the complete vehicle. (Author)

AD-A094 208/6 PC **A04**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
International Aviation (Selected Articles),
Du Haiping, Yang Xueyu, and Fei Han. 8 Dec 80, 54p Rept no. FTD-ID(RS)T-1396-80
Edited trans. of Guoji Hangkong (China) n6 p28-36 Jun 80, by William Brown.

No abstract available.

AD-A094 225/0 PC **A05**/MF **A01**
Information Spectrum, Inc., Warminster, PA.
Compilation of Energy Efficient Concepts in Advanced Aircraft Design and Operations. Volume I. Technical Report.
Final rept. 10 Mar-5 Nov 80,
Milton Clyman, Sheldon J. Einhorn, and Richard S. Shultz. 5 Nov 80, 98p NADC-79239-60-VOL-1
Contract N62269-80-C-0200
See also Volume 2, AD-A094 226.

This final report (contained in two volumes) presents the results of research into published literature. The search addressed the technologies necessary to support next generation (IOC 1990+) air vehicle design and operation concepts that will reduce the requirement for natural petroleum-derived energy. The Advanced Concepts Evaluation (ACE) Data Base consists of 599 unique abstracts listed as 948 entries. The ACE Data Base is arranged into eleven areas of R&D effort, each subdivided into Navy and non-Navy funded programs. Volume I includes introduction, Data Bases searched, research methodology for creation of the ACE Data Base, summary of search results, conclusions and recommendations. This volume contains an appendix of search strategies utilized.

AD-A094 226/8 PC **A19**/MF **A01**
Information Spectrum, Inc., Warminster, PA.
Compilation of Energy Efficient Concepts in Advanced Aircraft Design and Operations. Volume II. Abstract Data Base.
Final rept. 10 Mar-5 Nov 80,
Milton Clyman, Sheldon J. Einhorn, and Richard S. Shultz. 5 Nov 80, 434p NADC-79239-60-VOL-2
Contract N62269-80-C-0200
See also Volume 1, AD-A094 225.

Volume II contains the ACE Data Base arranged into eleven areas of R&D effort as follows: Fuels--Synthetic, Liquid Hydrogen, Other; Propulsion--Gas Turbine, Nuclear, Advanced; Aerodynamics; Structures and Materials; Flight Performance Management; Advanced & Unconventional Systems; and Energy Efficient Operation.

AD-A094 349/8 PC **A04**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Investigation of EMAT Base System for the Detection of Bolt Hole Type Cracks. Part I. Detection of Cracks in the Inaccessible Lower Half of Wing Lap Joints Using EMATS,
Interim rept. 1 Apr-31 Aug 78,
C. V. Vasile, R. H. Houston, and R. B. Thompson. Jul 80, 66p SC595.44C5A, AFWAL-TR-80-4081-PT-1
Contract F33615-74-C-5180, DARPA Order-2828
See also Part 2, AD-A094 350.

The detection of saw slots in an aircraft wing lap joint is demonstrated with EMATS (Electromagnetic acoustic transducers) utilizing 250 KHz horizontal shear acoustic waves reflected from the fastener area. A real-time Fourier transform signal processor was developed and used to gather experimental data and generate plots of power vs. frequency as well as the complex transform. A simple ultrasonics model is described which is capable of explaining many of the features of the experimental data. (Author)

AD-A094 350/6 PC **A06**/MF **A01**
Rockwell International, Thousand Oaks, CA. Science Center.
Investigation of EMAT Base System for the Detection of Bolt Hole Type Cracks. Part II. Reliability Evaluation and System Definition for Detection of Cracks Under Fasteners by EMATs.
Interim rept. 12 Apr-15 Sep 79,
J. F. Martin, P. J. Hodgetts, and R. B. Thompson. Jul 80, 105p SC595.65IR, AFWAL-TR-80-4081-PT-2
Contract F33615-74-C-5180, DARPA Order-2828
See also Part 1, AD-A094 349.

The detection of laboratory grown fatigue cracks in aircraft wing lap joint fastener holes is demonstrated with EMATs (electromagnetic acoustic transducers). Operating at a 200 kHz central frequency, the EMATs employ acoustic waves in reflection and transmission to measure the presence of both fatigue cracks and loose fasteners. A minicomputer-based data acquisition and analysis system acquires, gates, apodizes and Fourier transforms each received time waveform. The resulting spectra are then compared to the spectra of uncracked holes with tight fasteners to determine the presence of a crack or loose fastener. A method for distinguishing the difference between a crack and a loose fastener is demonstrated. A suggested design for a fieldable instrument capable of the same abilities is presented. (Author)

AD-A094 387/8 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Analysis of Service Cracking in F-27 Aircraft Wings.
Structures note,
G. S. Jost. Oct 79, 36p Rept no. ARL/STRUC-Note-456

Weibull extreme value distribution have been fitted to times to first cracking in the wing access openings of Australian and Papua-New Guinea F-27 aircraft. A method is given for estimating the distribution parameters from the service data, which include very often more runouts than cracks. (Author)

AD-A094 389/4 PC **A02**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
An Investigation into the Ice Build Up on the Nozzle Matrix of the 'Pegasus' Icing Spray System.
Technical memo.,
C. S. Wilson, and P. B. Atkins. Dec 79, 19p Rept no. ARL/MECH-ENG-TM-397

During the course of flight experiments using an airborne icing spray system fitted to a Nomad aircraft, ice build up on the spray matrix was encountered after prolonged spraying at high liquid water contents at low temperatures. The problem was found to be caused by airflow separation on the fairing to the matrix tubing which induced water droplets back onto the fairing. Tests on a ground icing rig showed that ice build up could be eliminated by redesigning the fairing to prevent the airflow separation. (Author)

PAT-APPL-6-085 662 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Ram Wing Aircraft Launch Platform System.
Patent Application,
David J. Perez. Filed 17 Oct 79, 11p AD-D008 051/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Battle damaged runways will sometimes have undamaged sections from which conventional landing gear aircraft could operate but do not have suf-

ficient undamaged runway to permit aircraft take-offs. Normally such a damaged runway would be unavailable for use by aircraft with conventional landing gear until the runway is repaired. According to this invention, a ram wing launch platform is provided to permit take-offs from battle damaged runways. Wheel latches are mounted on the platform and secure the platform to the aircraft. The wheel latches and parachute are operated by pilot operated switches. A pair of spoilers are provided which are controlled by pilot operated servo control, to stabilize the platform during take-off and aircraft rotation. A parachute system is provided to decelerate the platform after aircraft take-off.

PB81-137473 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Logistics and Communications Div.
F-16 Integrated Logistics Support: Still Time to Consider Economical Alternatives.
Report to the Congress.
20 Aug 80, 56p LCD-80-89

While the Air Force's integrated logistics support plan for the F-16 should ensure that the aircraft will be adequately maintained, there is still time and opportunity to improve its effectiveness and reduce support costs. This report recommends several alternative operational and support concepts which Department of Defense and Air Force logistics planners need to consider for the still developing F-16 program.

PB81-144180 PC **A02**/MF **A01**
National Research Council, Washington, DC.
An Evaluation of NASA's Program for Advancing Rotorcraft Technology.
Final rept.
1978, 19p
Contract NASw-2342

This report is a survey of the technological needs and opportunities for improving various types of rotorcraft over the next two decades and the adequacy of NASA's proposed research effort to provide the necessary technology in that period.

PB81-801847 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Remotely Piloted Vehicles. November, 1975-December, 1980 (Citations from the NTIS Data Base).
Rept. for Nov 75-Dec 80.
Jan 81, 320p
Supersedes PB80-802119, and NTIS/PS-78/1246.

Operation of vehicles under remote guidance and control is investigated in these Government-sponsored research reports. Aircraft, drones, and extra-terrestrial explorers are among the areas researched. (This updated bibliography contains 312 citations, 50 of which are new entries to the previous edition.)

1D. Aircraft Flight Control and Instrumentation

AD-A094 037/9 PC **A06**/MF **A01**
Wilson-Hill Associates, Inc., Washington, DC.
General Aviation Avionics Statistics: 1976.
Annual rept. CY1976,
Judith C. Schwenk, and Paula Shafer. Nov 79, 117p TSC-FAA-79-28, FAA-MS-79-6
Contract DOT-TSC-1750

This report presents avionics statistics for the 1976 general aviation (GA) aircraft fleet and is the third in a series titled 'General Aviation Avionics Statistics.' The statistics are presented in a capability group framework which enables one to relate airborne avionics equipment to the capability for a GA aircraft to function in the National Airspace System. The word 'capability' is used in this report to mean in what segments of the airspace an aircraft can fly, under what conditions it can fly, and at what airports it can land. The framework permits the GA fleet to be divided into groups according to their capabilities as dictated by the avionics configurations of the aircraft. Differences in various characteristics of the aircraft are examined among the capability groups. The FAA's 1976 Aircraft Statistical Master File is the source of all the statistical data used in this report. (Author)

AD-A094 070/0 PC **A06**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Research in Multirate Estimation and Control.
Annual rept. 1 May 79-1 May 80,
Douglas P. Glasson. 20 Dec 80, 124p Rept no. TASC-TR-1356-1
Contract N00014-79-C-0431

A new approach to multirate control system synthesis based on optimal estimation and control theory is developed. The new techniques obviate dimensionality problems typical of classically based design techniques and offer a systematic procedure for designing to desired closed-loop specifications. Mathematical derivations of the optimal multirate state estimator, regulator, and proportional-plus-integral controllers are presented. The transient response and robustness properties of multirate systems designed by the present techniques are investigated through examples. (Author)

AD-A094 072/6 PC **A07**/MF **A01**
Transportation Systems Center, Cambridge, MA.
General Aviation Avionics Statistics: 1977.
Annual rept. CY1977,
Judith C. Schwenk, Paula Shafer, and Preeti Pandit. Jun 80, 133p TSC-FAA-80-13, FAA-MS-80-6

This report presents avionics statistics for the 1977 general aviation (GA) aircraft fleet and is the fourth in a series. The statistics are presented in a capability group framework which enables one to relate airborne avionics equipment to the capability for a GA aircraft to function in the National Airspace System. The word 'capability' is used in this report to mean in what segments of the airspace an aircraft can fly, under what flight rules it can fly, and at what airports it can land. The framework permits the GA fleet to be divided into groups according to their capabilities as dictated by the avionics configurations of the aircraft. Differences in various characteristics of the aircraft are examined among the capability groups. The FAA's Sample File of results from the 1977 GA Activity and Avionics Survey is the source of all the statistical data used in this report.

AD-A094 168/2 PC **A05**/MF **A01**
Automation Industries, Inc., Silver Spring, MD. Vitro Labs. Div.
Wind Shear Systems Implementation Plan, Benefit/Cost Study.
Final rept. 19 Aug 79-Jun 80 on Phase 2,
Byron F. Bond. Aug 80, 80p FAA-RD-80-103
Contract DOT-FA79WA-4279

Since July 1973 there have been eight U.S. air carrier accidents attributed to encounters with strong low-level wind shears during terminal flight operations. The FAA research and development effort has taken a threefold approach to the wind shear problem: (1) developing and implementing improved forecasting techniques and procedures for predicting and reporting low-level wind shear in the terminal area; (2) placing wind shear detection equipment on the ground and transmitting information to the pilot; and (3) installing equipment aboard the aircraft that would provide the pilot with wind shear information in 'real time'. The results of the latter effort, i.e., airborne wind shear systems and techniques are evaluated as to their relative benefits and costs both to the user and to the FAA. Ground speed is a major input variable to many of the candidate airborne wind shear systems. Eight techniques for providing ground speed are evaluated and cost comparisons are documented. Also evaluated are three self contained wind shear systems that do not rely on ground speed as a reference and a head-up display for displaying wind shear data. (Author)

AD-A094 196/3 PC **A13**/MF **A01**
Tennessee Univ. Space Inst., Tullahoma.
Proceedings: Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems (4th), March 25-27, 1980.
Conference publication,
Walter Frost, and Dennis W. Camp. Mar 80, 285p NASA-CP-2139, FAA-RD-80-67
Contract NAS8-32692

The proceedings of a workshop on meteorological and environmental inputs to aviation systems held at The University of Tennessee Space Institute, Tullahoma, Tennessee, March 25-27, 1980, are reported. The workshop was jointly sponsored by NASA, NOAA, and FAA and brought together many disciplines of the aviation communities in round table discussions. The major objectives of the workshop are to satisfy such needs of the sponsoring agencies as the expansion of our understanding and knowledge of the interaction of the atmosphere with aviation systems, the better definition and implementation of services to operators, and the collection and interpretation of data for establishing operational criteria relating the total meteorological inputs from the atmospheric sciences to the needs of aviation communities. The unique aspects of the workshop were the diversity of the participants and the achievement of communication across the interface of the boundaries between pilots, meteorologists, training personnel, accident investigators, traffic controllers, flight operation personnel from military, civil, general aviation, and commercial interests alike. Representatives were in attendance from government, airlines, private agencies, aircraft manufacturers, Department of Defense, industries, research institutes, and universities. Full-length papers from invited speakers addressed topics on icing, turbulence, wind and wind shear, ceilings and visibility, lightning, and atmospheric electricity.

PB81-143539 Not available NTIS
National Bureau of Standards, Washington, DC.
Survey of Altimeter Calibration Accuracy,
Charles R. Tilford, Sharrill D. Wood, and Allan J. Lundquist. May 80, 6p
Pub. in Proceedings of the Air Data Systems Conference (1980) Held at the U.S. Air Force Academy, Colorado Springs, CO. on May 5-8, 1980, SRDS Tech. Letter Report No. RD-80-6-LR, 6p, 8 May 80.

Limited data exist from which to determine what altimeter accuracies are actually achieved in field use. In order to acquire some information about altimeter accuracy and, in particular, to evaluate whether or not adequate pressure measurement accuracy is available to the aviation community, a limited measurement survey of altimeter repair and calibration shops has been performed. A commercial transfer-standard quality pressure transducer was modified for field use. It was repeatedly calibrated in the field using a portable calibration unit. This equipment and calibration procedures were able to maintain an uncertainty of .001 in Hg + .01% of reading for the transfer standard. Several instrument repair shops were then asked to calibrate the transfer standard in the same manner they would an altimeter. The results of these comparisons and the details and performance of the equipment used are discussed.

1E. Air Facilities

AD-A094 164/1 MF **A01**
Transportation Systems Center, Cambridge, MA.
Atlanta Tower Cab and TRACON Equipment Integration Analysis.
Final rept. Oct 78-Sep 79,
Paul Rempfer, Lloyd Stevenson, and M. Stephen Huntley, Jr. Oct 80, 429p TSC-FAA-80-14, FAA-RD-80-126
Availability: Microfiche copies only.

This report presents an analysis of how the new Terminal Information Processing System (TIPS) and Consolidated Cab Display (CCD) equipments might appear to Air Traffic personnel if they were installed in the tower cab and TRACON at Hartsfield-Atlanta Airport. The analysis includes an operations analysis of the current Atlanta tower cab and TRACON operations, and preliminary designs of the TIPS and the CCD as applied to those operations. In addition, the potential integration of the two systems is discussed. (Author)

AD-A094 222/7 PC **A09**/MF **A01**
Office of the Chief of Engineers (Army), Washington, DC.
Airfield Damage Recovery Techniques of Engineer Brigade in Europe (18th),
Theodore Stroup, David Reed, and George M. Hammitt. Dec 80, 180p

The purpose of this interim document is to provide documentation of airfield damage recovery (ADR) techniques within the 18th Engineer Brigade in Europe. This information can be used by the researcher and troop user alike to provide the repair of craters necessary to restore an airfield's horizontal construction to operational capability. The long-range purpose is to develop improved systems allowing a field commander to respond to various levels of hostility with a minimum of manpower, time, and cost. Current information within the state of the art of ADR can be used by units in the field for planning, estimating needed materials, organizing, and then accomplishing war damage repair missions to airfield pavements. The methods, materials, and techniques presented are those currently available for war-damaged airfield runways, taxiways, aprons, and roadways.

AD-A094 264/9 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
NOISEMAP - The USAF's Computer Program for Predicting Noise Exposure Around an Airport,
Jerry D. Speakman. Dec 80, 5p Rept no. AFAMRL-TR-80-128
Pub. in Inter-Noise 80, p823-826 8-10 Dec 80.

No abstract available.

2. AGRICULTURE

2B. Agricultural Economics

PB81-135154 PC **A05**/MF **A01**
Ministry of Agriculture and Cooperatives, Bangkok (Thailand). Div. of Agricultural Economics.
Agricultural Sector Analysis in Thailand. Final Report.
Jul 79, 99p DAE-CARD SECTOR ANALYSIS SER-16, AID-PN-AAH-110
Contract AID/CM/SA-C-73-19, Grant AID/CSD-2824
Prepared in cooperation with Iowa State Univ., Ames. Center for Agricultural and Rural Development.

This is the final report on the six-year Agricultural Sector Analysis project to improve the ability of the Royal Thai Government (RTG) to make decisions affecting agriculture. Large scale national and regional models that allow comparison of alternatives in policy and developmental programs were constructed and applied. These models provide detailed and operational policy and planning information in order to identify those development potentials/policy alternatives that are complimentary rather than competitive to the economic growth of the country. The models are also used for developing five-year plans in the agricultural sector and are kept operational for continuous analysis of agricultural alternatives and policy inputs. This report contains a description of the five major types of analysis addressed in the project--agricultural sector, rural development, macro-modeling, commodity demand, and transportation and marketing analysis.

PB81-149619 PC **A09**/MF **A01**
Ministry of Agriculture and Cooperatives, Bangkok (Thailand). Div. of Agricultural Economics.
National Crop Model of Thailand,
Arthur L. Stoecker. Mar 79, 200p DAE-CARD SECTOR ANALYSIS SER-15, AID-PN-AAH-112
Contract AID/CM/SA-C-73-19, Grant AID/CSD-2824
Prepared in cooperation with Iowa State Univ., Ames. Center for Agricultural and Rural Development.

The purpose of this report is to provide a semi-technical description of the crop model, the assumptions and the results of a study which provided guidelines for Thailand's Fourth Five-Year Agricultural Development Plan. The study is primarily concerned with the productive capacity of Thai agriculture relative to food needs of a growing population and relative to alternative levels of exports. Problems of income and employment are further compounded by a declining area of unexploited croppable land.

2C. Agricultural Engineering

PB81-143661 PC **A03**/MF **A01**
Oklahoma Water Resources Research Inst., Stillwater.
Water-Conserving Wheat Irrigation Schedules Based on Climatic Data.
Completion rept. 1 Oct 78-30 Sep 80,
M. B. Kirkham. 1980, 46p W81-00811, OWRT-B-045-OKLA(1)
Contract DI-14-34-0001-9129

Irrigation schedules were developed based on correlations between yield and rainfall for the Oklahoma area. Historical records show that wheat yields are best when rain falls within a five day interval in late March. Past irrigation scheduling did not call for water applications to begin until after April 1. The records used to develop the correlations were for spring rainfall and grain yield on winter wheat grown between 1960 and 1977 at Stillwater and Goodwell, Oklahoma.

PB81-144651 PC **A03**/MF **A01**
Hawaii Univ., Honolulu. Water Resources Research Center.
Treatment of Mililani STP Effluent for Drip Irrigation of Sugarcane.
Technical rept. Oct 76-Oct 78,
Edward K. F. Liu, and Reginald H. F. Young. Jul 79, 40p TR-128, W81-00984
Contract DI-14-34-0001-9013

Reclaimed municipal waste water effluent is intended for use as irrigation water, primarily on sugarcane, the largest single user of water in the state. Various studies have found that, with proper irrigation management, sugar yields can increase when sewage effluent is used in conjunction with normal irrigation ditch water. The objective of an ongoing study by the WRRC is to determine the feasibility of using secondary sewage effluent in drip irrigation. The sewage effluent selected for reclamation studies comes from the Mililani Sewage Treatment Plant (STP) which is ideally suited for reclamation and reuse of its effluent. The objective of this study was to investigate the feasibility of various treatment methods for decreasing the concentration of suspended solids in the effluent discharged by the Mililani STP. The level of suspended solids in Waiahole Ditch water and in the Mililani STP effluent was established, and the method was determined of treatment required at Mililani STP to ensure the same concentration of suspended solids in the discharged effluent as in Waiahole Ditch water. The treatment methods investigated included chemical coagulation, granular media filtration, and dissolved air flotation.

PB81-802720 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Water Pumps. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 90p
Supersedes PB80-802531, and NTIS/PS-78/1288.

Design concepts and the technical and economic feasibility of using solar energy to pump water are discussed in abstracts from worldwide literature. Topic areas cover the use of solar heat actuated Rankine cycle engines and free cylinder Stirling engines for solar powered water pumps, pumps driven by photovoltaic modules, and application of solar pumps to irrigation and electric power generation. (This updated bibliography contains 60 citations, 20 of which are new entries to the previous edition.)

2D. Agronomy and Horticulture

PATENT-4 237 984 Not available NTIS
Department of Agriculture, Washington, DC.
Rotating Field Plot Row Marker.
Patent,
David L. Cobb, Brian L. Doyle, James A. Webster, and David H. Smith, Jr. Filed 30 May 79, patented 9 Dec 80, 5p PB81-147498, PAT-APPL-6-043 976
Supersedes PB80-114804.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a rotating row marker equipped with both transverse and longitudinal imprinting projections which impresses a grid-type pattern into the soil for precise placement of seeds or seedlings in a subsequent planting operation. One of the transverse projections houses an eccentric weight for gravitationally returning the row marker to a predetermined position when the row marker is raised above the earth.

2E. Animal Husbandry

PB81-145294 PC **A04**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
A Village Level Extension Guide for the Introduction and Maintenance of Animal Traction,
Merritt W. Sargent. Oct 79, 54p AID-PN-AAH-058
Contract AID/afr-C-1260

The guide provides an overview of the issues arising from the introduction and support of animal traction at the village level in francophone West Africa. The author intends to provide an understanding of the interacting dynamics of animal traction in small-holder agriculture; analytical tools which will assist village agents in helping farmers make choices and reorganize their farms; and practical guidelines for the training, maintenance, and support activities necessary to various components of the system. The five major components of animal traction technology-farm power source, the equipment, the cropping system, the credit system, and village organization, are presented. A set of guidelines presenting checklists for the major elements in the introduction and maintenance of animal traction (animal choice, training, maintenance, health and finishing diets; cropping operations and crop mix; and credit capacity) is included in the form of eight appendices.

PB81-145302 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
A Provincial Planning and Implementation Guide for the Introduction and Maintenance of Animal Traction,
Merritt E. Sargent. Oct 79, 28p AID-PN-AAH-059
Contract AID/afr-C-1260

The paper presents guidelines for planning a provincially based program to introduce and support animal traction (ANTRAC) projects in francophone West Africa. The inherent characteristics of ANTRAC technology and existing agricultural development organization dictate the provincial, rather than village, basis of such projects. The guide begins with a discussion of ANTRAC project planning, citing the importance of maintaining realistic expectations of farm performance; the section

focuses on the information needs, farm level technical package, credit system, personnel needs and training, logistical infrastructures, and village level organization involved in ANTRAC project design. Next, some considerations concerning the animals, equipment, credit and insurance system and ANTRAC associations which necessitate some special organization in project implementation are reviewed.

PB81-145310 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Agricultural Economics.
Recommendations to National Governments and International Donors for the Design and Implementation of Animal Traction Programs.
Merritt W. Sargent. Oct 79, 17p AID-PN-AAH-057
Contract AID/afr-C-1260

The paper highlights issues in the design and implementation of animal traction (ANTRAC) programs in francophone West Africa which are of primary concern to national governments and international donors. ANTRAC projects continue to benefit from funding priorities because of the recent Sahelian drought, the rise in petroleum product prices, and the fact that this agricultural technology is very appropriate in the context of developing country needs versus resources. The author recommends certain guidelines for levels of funding and for the organization of national institutions which contribute to the administration and implementation of ANTRAC projects.

2F. Forestry

PB81-144537 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Yield and Quality of Seed from Yellow Birch Progenies.
Forest Service research paper (Final),
Knud E. Clausen. Sep 80, 9p FSRP-NC-183

Seed yield in 8- and 9-year-old yellow birch varied among families and years but averaged more than 1,500 seeds per tree. Long catkins contained more seed than short ones. Seed quality was poor due to insufficient pollination and to differences among trees in flowering phenology.

PB81-145724 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Phenology of Common Forest Flora of the Northern Rockies--1928 to 1937.
Forest Service research paper,
Wyman C. Schmidt, and James E. Lotan. Oct 80, 20p FSRP-INT-259

This paper presents 10 years (1928 to 1937) of phenological observations in the Northern Rockies. Phenological events are summarized by earliest, latest, and average dates of occurrence. Included are records for 50 species--13 conifers, 22 hardwood trees and shrubs, and 15 herbaceous plants found in northern Idaho and in National Forests as well as Yellowstone and Glacier National Parks.

PB81-145807 PC **A04**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Timber Resource of Minnesota's Prairie Unit, 1977.
Forest Service resource bull. (Final),
Jerold T. Hahn, and W. Brad Smith. Jan 81, 68p FSRB-NC-45

The fourth inventory of Minnesota's Prairie Unit shows that although commercial forest area decreased 31.7 percent between 1962 and 1977, growing-stock volume increased 22 percent. This report gives statistical highlights and contains detailed tables of forest area as well as timber volume, growth, mortality, ownership, and use.

PB81-145856 PC **A04**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Mountain Pine Beetle Dynamics in Lodgepole Pine Forests. Part I: Course of an Infestation.
General technical rept.,
Walter E. Cole, and Gene D. Amman. Nov 80, 64p FSGTR/INT-89

The report represents much original research by the authors, but is also a review of published literature on the mountain beetle with particular reference to epidemic infestations. Part I addresses how the beetle 'moves through' a lodgepole pine stand, with emphasis on relationships between the beetle and its environmental factors. Part II deals with the 'inner workings' of a mountain pine beetle population, including the bionomics, mortality factors, and important entomological relationships. Part III is the model of the mountain pine beetle-lodgepole pine interaction.

PB81-147068 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
How to Diagnose Black Walnut Damage.
Forest Service general technical rept. (Final),
Barbara C. Weber, Robert L. Anderson, and William H. Hoffard. Jan 80, 25p FSGTR-NC-57
Color illustrations reproduced in black and white.

The report presents a key to common insect, disease, animal, and other damages to black walnut. Also it includes illustrations of many of the damage types and descriptions of the causal agents. Preventive or control recommendations are made where appropriate.

PB81-147076 PC **A07**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Index to the Proceedings of the Tall Timbers Fire Ecology Conferences: Numbers 1-15, 1962-1976.
General technical rept.,
William C. Fischer. Jul 80, 146p FSGTR/INT-87

This report provides an index to the contents of the 15-volume Proceedings of the Tall Timbers Fire Ecology Conferences held annually from 1962 to 1974. All of the papers published in the Proceedings are listed by author, date, and title. The contents of these papers can be searched by using the five-part index provided.

PB81-147084 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Pulpwood Production in the North Central Region by County 1978.
Forest Service resource bull. (Final),
James E. Blyth, and W. Brad Smith. Jan 81, 27p FSRB-NC-50
See also report dated Jan 80, PB80-130347.

The report discusses 1978 production and receipts and recent production for other years in the Lake and Central States. It shows Michigan, Minnesota, and Wisconsin production by species for each county and compares production by Forest Survey Unit with that of previous years. Presents 1978 production and receipts data for Illinois, Indiana, Iowa, and Missouri, and shows four production classes by county.

PB81-147191 PC **A03**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Energy and Wood from Intensively Cultured Plantations: Research and Development Program.
Forest Service general technical rept. (Final).
Jan 81, 32p FSGTR-NC-58
Color illustrations reproduced in black and white.

Since 1971 there has been significant progress in greatly increasing yields of wood and energy (biomass) from intensively cultured plantations compared with natural stands. This publication reports the results of studies and summarizes the 'maximum-yield' research in progress at the North Central Forest Experiment Station.

PB81-149767 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
The Supply and Energy Potential of Forest Resources in Northern Wisconsin and Michigan's Upper Peninsula.
Forest Service research paper (Final),
Dennis P. Bradley, Eugene M. Carpenter, James A. Mattson, Jerold T. Hahn, and Sharon A. Winsauer. Sep 80, 25p FSRP-NC-182

This report contains two related assessments of forest energy potential. First, a detailed study was made of Mead Corporation's pulp and paper mill in Escanaba, Michigan. This mill has a procurement area covering most of Michigan's Upper Peninsula and a small part of northeastern Wisconsin. Second, a broader evaluation was made for 10 of the 21 pulp and paper mills in the four Forest Survey Units of northern Wisconsin and Upper Michigan.

PB81-150716 PC **A03**/MF **A01**
National Research Council, Washington, DC. Board on Science and Technology for International Development.
Firewood Crops: Shrub and Tree Species for Energy Production.
Final rept.
1980, 50p CIR/BOSTID-80/27
Contract AID/csd-2584
Library of Congress catalog card no. 80-83796.

More than one-third of the world's population depends on wood for cooking and heating. Eighty-six percent of all the wood consumed annually in the developing countries is used for fuel, and of this total at least half is used for cooking. In the face of global concern over the dwindling supply of firewood, the rate of forest decimation to provide basic human necessities in developing countries is alarming. This report suggests potentially significant fuelwood candidates for introduction to suitable environments. Primary emphasis is on species suitable for growing firewood for individual family needs. However, species suited to plantation cultivation for fueling small industrial factors, electric generators, and crop driers are also considered.

PB81-802886 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Development of Forest Industries. 1964-December, 1979 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 79.
Jan 81, 288p
Supersedes PB80-801764, and NTIS/PS-78/1276.

The citations provide information on lumber and plywood production, as well as on methods of storage and handling of logs and wood products. Opportunities for employment, business investments, and economic promotion in underdeveloped areas are included. (This updated bibliography contains 283 citations, none of which are new entries to the previous edition.)

PB81-802894 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Development of Forest Industries. December, 1979-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 79-Dec 80.
Jan 81, 42p
Supersedes PB80-801764, and NTIS/PS-78/1276.

The citations provide information on lumber and plywood production, as well as on methods of storage and handling of logs and wood products. Opportunities for employment, business investments, and economic promotion in underdeveloped areas are included. (This updated bibliography contains 37 citations, all of which are new entries to the previous edition.)

SLU-IVL-107 PC **A05**/MF **A01**
Sveriges Lantbruksuniversitet, Uppsala. Institutionen foer Virkesiaera.
Wood Properties of Salix Caprea and Salix Pentandra.
L. Sennerby. 1979, 83p
In Swedish.

Salix caprea and Salix pentandra have been investigated with regard to the qualities and the anatomy of wood in these species. The type and distribution of cells, cell wall thickness, cell diameter and differences between early-and late wood cells in one annual ring have been studied. The specific gravity was determined through measuring the oven dry weight and the green volume of the samples and is given in kg/m exp 3 . The length of fibers (that is tracheids, fiber tracheids and libriform fibers) in S.caprea and S.pentandra fluctuates between 0.5 to 1.1 mm and the length of vessels varies between 0.3 to 0.6 mm. There is a gradient in that the length of the cells increases from the pit towards the cambium in the cross-section of the wood. The variation in the stem shows an increase in cell-length from the stump to breast-height (1.3 m) and then the cells become shorter again. There was no significant difference to be found in this respect between the two species investigated. One-year-old sprouts of S.capres, S.viminalis, S.fragilis, and S.smithiana have been investigated with regard to specific gravity, moisture quotient, bark percentage, and the constitution of vessel members and fibers. (ERA citation 06:004658)

SLU-RIC-49 PC **A04**/MF **A01**
Sveriges Lantbruksuniversitet, Alnarp. Research Information Centre.
Investigation - Biomass.
I. Svensson. May 79, 56p
In Swedish.
U.S. Sales Only.

The requirements for agro-forestry are discussed. It is pointed out that the atmospheric precipitation has to be over 500 mm per year, ground water should exist at on average depth of 40 cm, the depth of soil has to be 70 cm and the ground must not incline more than 20%. It has been estimated that in Sweden there is maximum of 3 x 10 exp 6 ha of ground which could be used for energy production forests. The environmental consequences of a very intense forest growing for the hydrology for other plants, for animals and insekts are discussed, and also the conflicts between different possibilities to use the ground. (ERA citation 06:004659)

3.

ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

AD-A094 383/7 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
A Parametric Study of Interstellar Helium Atoms Incident upon the Earth.
Memorandum rept.,
R. R. Meier. 28 Jan 81, 37p Rept no. NRL-MR-4423

Calculations of the intensity of interstellar helium atoms at earth orbit are made with a model which takes into account perturbation of the Maxwell-Boltzmann velocity distribution by solar gravity and photoionization loss. Seasonal sky maps are presented and assessments of the sensitivity of the intensity of atoms in the vicinity of the earth to the various parameters of the gas are given. (author)

INIS-mf-5753 PC **A07**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
Magnetohydrodynamic and Thermal Processes in Solar Flare Energy Build-Up and Release.
W. van Tend. 1979, 133p
Thesis.
U.S. Sales Only.

A solar flare can be described as an instability in the upper solar atmosphere that converts 10 exp 28 ergs to 10 exp 32 ergs of magnetic energy into other forms of energy, mainly kinetic energy. The solar flare gives rise to a wealth of observable phenomena. The author develops a fairly simple model to explain many of these apparently very diverse features of solar flares. (Atomindex citation 11:529937)

INIS-mf-5758 PC **A07**/MF **A01**
Utrecht Rijksuniversiteit (Netherlands).
X-Ray Observations of the Astronomical Netherlands Satellite.
A. J. F. den Boggende. 1979, 147p
Thesis.
U.S. Sales Only.

The results of observations of some cosmic X-ray sources are collected, and the functioning and spectrophotometric calibration of the instruments is discussed. (Atomindex citation 11:529766)

MPI-PAE/Astro-188 PC **A03**/MF **A01**
Max-Planck-Inst. fuer Physik und Astrophysik, Munich (Germany, F.R.).
New Equation of State of Supernova Matter.
M. F. El Eid, and W. Hillebrandt. Jul 79, 43p
U.S. Sales Only.

An equation of state of matter at high densities (rho > 10 exp 11 g cm exp -3) and temperatures (T > 5 x 10 exp 9 K) is presented, which includes several important effects such as neutron and proton degeneracy as well as nucleon-nucleon interactions and nuclear excitations. Results are given for matter in both nuclear statistical equilibrium and beta -equilibrium for different values of entropy, density and temperature. The numerical computations have been performed mainly for these values of the parameters which can be expected in the interiors of collapsing massive stars and supernovae, but our method can just as well be applied to other astrophysical systems, e.g. hot neutron stars. In the present work we assume that nuclei obey Boltzmann statistics up to essentially nuclear matter density (rho approximately equal to 2 x 10 exp 14 g cm exp -3) and we neglect some effects due to their finite size (e.g. excluded volume effects and Coulomb interactions). The extension of our treatment to include such effects is presently under way and will be published in a subsequent paper. (Atomindex citation 11:529803)

PB81-134595 Not available NTIS
National Bureau of Standards, Washington, DC.
Stellar Chromospheres and Coronae,
J. L. Linsky. 1979, 7p
Pub. in Trans. IAU (Report of Commission 36 on Theory of Stellar Atmospheres), XVIIA, Pt. 2, p197-203 1979.

Important advances have been made recently in this field due to the development of spectroscopic diagnostics and the growth of ultraviolet and X-ray data from space. These data lead to estimates of physical properties in chromospheres and coronae of individual stars, and to a first generation of models. In some cases crude estimates of radiative losses have been made; these pose tests of theoretical estimates of nonradiative heating rates.

PB81-140964 PC **A04**/MF **A01**
Alabama Univ. in Huntsville.
Dynamic Modeling of Coronal Transients and Interplanetary Disturbances.
Final rept.,
R. S. Steinolfson. Jan 80, 72p UAH-RR-235, NOAA-80110301
Contract NOAA-04-78-B01-6

The formation and propagation of coronal transients and interplanetary disturbances are simulated with the use of numerical solutions of the time-dependent equations of motion. The objective is to obtain a better understanding of the actual physical properties in solar events and the associated coronal transients and interplanetary disturbances. The propagation of Alfven waves in the solar wind and the steepening of large-amplitude waves into shocks are studies in Section 2. The procedure necessary to simulate the formation of interplanetary disturbances at the solar suface and their propagation outward through the critical points to the outer corona is presented in Section 3. In Section 4 a two-dimensional model is used to study the propagation of coronal transients in the meridional plane in the lower corona. One study discussed concerns the effect of the pre-existing magnetic field on the propagation of coronal transients. Another study involves the formation of coronal transients from the emergence of magnetic flux into the corona near the neutral line of an existing magnetic field.

PB81-144735 Not available NTIS
National Bureau of Standards, Washington, DC.
A Microstructural Study of the Tishomingo Meteorite,
L. K. Ives, M. B. Kasen, R. E. Schramm, A. W. Ruff, and R. P. Reed. 1978, 16p
Sponsored in part by National Aeronautics and Space Administration, Washington, DC.
Pub. in Geochim. Cosmochim. Acta 42, p1051-1066 1978.

Metallography, electron microscopy and X-ray diffraction techniques were employed to study a fragment of the Tishomingo iron meteorite.

PB81-145278 PC **A08**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 433, September 1980. Part I (Prompt Reports). Data for August 1980, July 1980, March 1980 and Late Data,
Helen E. Coffey. Sep 80, 172p SGD-433-PT-1, NOAA-80110702
See also Number 433, Part 2, PB81-145286 and Number 432, Part 1, PB81-124968.

In addition to an index for 1979-1980, this prompt report provides data for August 1980 on: alert periods, daily solar indices, solar flares, solar radio emission, solar wind measurements, coronal holes, spacecraft observations, inferred interplanetary magnetic field polarities, mean solar magnetic field and Boulder Geomagnetic Substorm Log. It also provides data for July 1980 on: daily solar activity centers, sudden ionospheric disturbances, spacecraft observations, solar radio emission, cosmic rays, geomagnetic indices and radio propagation indices. Late data includes solar radio emission June 1980, cosmic rays and geomagnetic indices for May and June 1980.

PB81-145286 PC **A03**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
Solar-Geophysical Data Number 433, September 1980. Part II (Comprehensive Reports). Data for August 1980, July 1980, March 1980, and Miscellanea,
Helen E. Coffey. Sep 80, 39p SGD-433-PT-2, NOAA-80110703
See also Number 432, Part 2, PB81-124950 and Number 433, Part 1, PB81-145278.

In addition to an index for 1979-1980, this issue of comprehensive reports provides data for March 1980 on: solar radio emission and solar x-ray radiation. The grouped solar flare data have again been delayed by another month due to a much needed vacation taken by Meudon colleagues. Preliminary listings from July through October 1979 are available on request.

PB81-149288 Not available NTIS
National Bureau of Standards, Washington, DC.
On the Difference at Chromospheric Levels between RS CVn-type Binaries, Active and Quiet Chromosphere Single Stars, and Active and Quiet Regions in the Sun,
J. L. Linsky. 1980, 2p
Pub. in Proceedings of Joint Meeting of Close Binaries and Stellar Activity, Montreal, Canada, August 18, 1979, Paper in Highlights of Astronomy, p861-862 1980.

This paper summarizes the differences in the properties of active chromospheres compared with quiet chromospheres by comparing active and quiet regions on the Sun, active and quiet chromosphere stars, and the very active chromospheres seen in close binary systems with chro-

mospheres of single stars. In particular, the chromospheres of the RS CVn-type binary systems UX Arietis and HR 1099 and the chromosphere of UX Arietis during a flare are modeled.

PB81-856890 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radio Telescopes. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 93p NERACUSGNT2291
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains information on theory, research, design, construction and applications of radio telescopes especially for space exploration. Computer controlled, x-ray and refracting radio telescopes are also included. (Contains 93 citations, fully indexed and including a table of contents.)

PB81-856908 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radio Telescopes. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 84p NERACEDBNT2291
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains global information on theory, research, design, construction and applications of radio telescopes especially for space exploration. Computer controlled, x-ray and refracting radio telescopes are also included. (Contains 86 citations, fully indexed and including a table of contents.)

PB81-856924 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radio Telescopes. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Dec 80, 174p NERACIAANT2291
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains information on theory, research, design, construction and applications of radio telescopes especially for space exploration. Computer controlled, x-ray and refracting radio telescopes are also included. (Contains 189 citations, fully indexed and including a table of contents.)

PB81-857096 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Astrophysics. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 144p NERACSPNNT2654
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning nuclear, thermonuclear, electromagnetic, and gravitational aspects of astrophysics. Observational and theoretical considerations of astrophysical phenomena are presented along with some of their cosmological implications. (Contains 135 citations, fully indexed and including a table of contents.)

PB81-857344 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Alfven Waves in Space. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 114p NERACSPNNT2841
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning studies and theories and some experimental observations for sources, mechanisms, and propagation characteristics of alfven waves and their interactions with electric fields, magnetic fields, and plasmas in space. Consideration is given to planetary, interplanetary, stellar, and interstellar environments. Alfven waves in the solar wind are treated prominently. (Contains 98 citations, fully indexed and including a table of contents.)

PB81-857724 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Black Hole Mathematics. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 62p NERACSPNNT2896
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning equations of state, equations of motion, and other specialized equations relating to the formation and evolution of black holes. Black hole physics is mathematically delineated and cosmological implications of black holes are considered. (Contains 55 citations, fully indexed and including a table of contents.)

PB81-857732 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Black Hole Gravitational Fields and Field Effects. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 146p NERACSPNNT2897
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning gravitational fields, waves, radiation, interactions, instability, and collapse related to the formation and evolution of black holes. Gravitational aspects of general relativity theory, perturbation theory, and other theoretical considerations for black holes are included along with cosmological implications. Some attention is given to observations of black hole gravitational effects upon electromagnetic radiation. (Contains 143 citations, fully indexed and including a table of contents.)

3C. Celestial Mechanics

PB81-133555 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Astronomical Programs: A Canon of Solar Eclipses for the Years -1500 to -1000,
R. R. Newton. Nov 80, 77p JHU/APL-CP-081
See also report dated Feb 77, AD-A037 314.

Several records of solar eclipses from the period between -1500 and -1000 have been preserved, and it is always possible that others may be found. None of these records has yet been dated, but if it ever becomes possible to date them, the results will be valuable both for historical studies and for studies of the non-gravitational forces acting within the solar system. This report presents a canon of all solar eclipses that occurred between -1500 and -1000. It includes the circumstances needed to determine the magnitude of each eclipse at any point on earth. It is a companion report to 'A Canon of Lunar Eclipses for the Years -1500 to -1000,' by R. R. Newton, APL/JHU CP 054, February 1977.

ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A094 025/4 PC **A04**/MF **A01**
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Upstream Particles Observed in the Earth's Foreshock Region.
Rept. for 1977-1978,
T. E. Eastman, R. R. Anderson, L. A. Frank, and G. K. Parks. Jul 80, 68p Rept no. U. of IOWA-80-26
Contract N00014-76-C-0016

Based primarily on an extensive study of fully three-dimensional plasma data, we describe the interrelationships of the upstream particles and plasma waves observed in the earth's foreshock region. The Univ. of Iowa LEPEDEAs detect ions and electrons from 1 eV to 45 keV over all except approx 2% of the unit sphere. Comparisons are made with high time resolution particle data obtained by the Univ. of Calif. (Berkeley) instruments and plasma wave data collected by the Univ. of Iowa plasma wave instruments on the two ISEE spacecraft. The presence of ion beams or dispersed ion distributions is found to be a sufficient condition for the presence of electrostatic and electromagnetic wave emissions. Detailed correlations of ions with plasma waves down to a tenth of an ion gyro-period indicate that ion-acoustic emission is enhanced when increased anisotropies and gyrophase organization are observed. Time aliasing effects limit the interpretation of velocity distributions taken within the foreshock region. High time resolution correlations between the different instruments, however, demonstrate that time variations of a single isotropic or anisotropic distribution cannot produce the dispersed ion distributions.

AD-A094 096/5 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Space Data Analysis Lab.
Seasonal-Latitudinal Tidal Structures of O, N2, and Total Mass Density in the Thermosphere,
Jeffrey M. Forbes, and Frank A. Marcos. 14 Nov 79, 7p AFOSR-TR-80-1262
Grant AFOSR-77-3223
Pub. in Jnl. of Geophysical Research, v85 nA7 p3489-3493, 1 Jul 80. Prepared in cooperation with Harvard Univ., Cambridge, MA. Center for Earth and Planetary Physics.

No abstract available.

AD-A094 120/3 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Behavior of High-Latitude Irregularities during Geomagnetic Disturbances.
Environmental research papers,
Zwi Houminer, and Jules Aarons. 24 Jun 80, 21p Rept nos. AFGL-TR-80-0194, AFGL-ERP-709

Scintillation observations of VHF and UHF transmissions from geostationary satellites at Goose Bay have been used to study the average characteristics of the high latitude irregularity region. The paper describes the average time development and mean diurnal pattern of irregularities during 58 magnetic storms in 1971-1976. The diurnal variation at Goose Bay shows two peaks of scintillation activity. One peak occurs during the afternoon hours, while the second occurs during the night. The average diurnal pattern is independent of type of storm. diurnal and seasonal effects appear only in the first day of storm commencement and not in the following days which show a very similar diurnal picture. (Author)

AD-A094 122/9 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
P78-2 SCATHA Preliminary Data Atlas.
Environmental research papers,
E. G. Mullen, H. B. Garrett, D. A. Hardy, and E. C. Whipple. 11 Aug 80, 42p Rept nos. AFGL-TR-80-0241, AFGL-ERP-712

A preliminary study of the 100 eV to approx. 1 MeV plasma environment encountered by the P78-2 Spacecraft Charging at High Altitudes (SCATHA) satellite during its initial operation period was conducted. Forty-four days of 10-min averages of the four moments of the electron and ion distribution functions calculated from the SC5 and SC9 energetic particle measurements were analyzed to determine occurrence frequency, local time variation, geomagnetic activity variation, and L-shell variation. The single and double Maxwellian parameters derived from the four moments were similarly analyzed. The interrelationships between the moments and derived parameters were computed and the results compared with the ATS-5 and ATS-6 atlas of Garrett et al (1980). Results of this analysis establish a baseline range for the SCATHA plasma environment.

AD-A094 434/8 PC **A03**/MF **A01**
Science Applications, Inc., Oak Brook, IL.
Atmospheric Triatomic Molecular Studies.
Final rept. 1 Mar 78-31 May 80,
A. C. Wahl, and J. H. Detrich. 17 Nov 80, 45p
SAI-1-230-00-414, AFOSR-TR-81-0008
Contract F49620-78-C-0050

A systematic study at the SCF and MCSCFCI level has been made of several of the fifteen triatomic atmospheric molecules which have formed the focus on this and previous work. In addition a powerful new Multiconfiguration Self Consistent Field (MCSCF) method has been developed and partially implemented. Also, in order to achieve accurate electron affinities and ionization potentials, a new scheme for configuration selection has been developed called the differential correlation energy method. This method has been tested on the processes CN yields CN(-) and CO2(-) yields CO2.

AD-A094 444/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Ice Particles in Clear Air,
A. A. Barnes, Jr. 1980, 5p Rept no. AFGL-TR-81-0009
Pub. in Communications a la VIII eme Conference Internationale sur la Physique de Nuages, p189-190, 15-19 Jul 80.

No abstract available.

PB81-857062 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Airglow. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 114p NERACSPNNT2629
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning studies; theories and interpretations; and satellite, rocket, balloon, and ground instruments for and observations of terrestrial airglow. Some attention is given to airglow on other planets. Consideration of excitation mechanisms for and behavior of airglow and associated indications of physical and chemical processes of the atmosphere and ionosphere are included. (Contains 109 citations, fully indexed and including a table of contents.)

PB81-857104 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Auroral Ovals. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 95p NERACSPNNT2663
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning observations, measurements, and theory of the sources and mechanisms for the formation and behaviour of planetary auroral ovals (chiefly for the earth). The roles of electric and magnetic field dynamics and charged-particle precipitations for disturbed and quiescent auroral ovals are considered. (Contains 70 citations, fully indexed and including a table of contents.)

PB81-857427 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Albedo. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 89p NERACSPNNT2880
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning measurements and interpretations and theoretical considerations of the albedo of the planets and planetary atmospheres (chiefly earth), and natural satellites and asteroids. Mechanisms for albedo fluctuations are also considered. (Contains 76 citations, fully indexed and including a table of contents.)

4B. Meteorology

AD-A094 082/5 PC **A04**/MF **A01**
Meteorology International, Inc., Monterey, CA.
Fields by Information Blending (FIB) Sea-Level Pressure Version.
Final rept.,
Manfred M. Holl, and Bruce R. Mendenhall. Dec 71, 74p
Contract N66314-70-C-5226
Also available as FNWC-TN-72-2.

A comprehensive technique for the objective analysis of scalar and of vector fields which has been developed is known as the Fields by Information Blending (FIB) technique. The FIB technique treats information as a metered commodity. It assembles all available information, which must include suitable weighting, and blends the information into resultant analyses and associated distributions of resultant resolution weight. In the FIB context, all information statements must include both parameter estimates and associated reliabilities. Any statement of information, whether observation or analysis value at a grid point, is incomplete without an associated reliability. For an independent piece of information the reliability, or report weight, is defined as the inverse of the error variance inherent in the observation and/or associated with the class of observation. For a statement of resolution the associated reliability, or resolution weight, is the inverse of the unresolved variance. The FIB technique is based entirely on rules for adding uncorrelated variance contributions and for adding independent information.

AD-A094 119/5 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Tests of Spectral Cloud Classification Using DMSP Fine Mode Satellite Data.
Environmental research papers,
James T. Bunting, and Ronald F. Fournier. 2 Jun 80, 44p Rept nos. AFGL-TR-80-0181, AFGL-ERP-704

A computer-based processor for satellite imagery was tested on samples of DMSP visible and IR imagery data smoothed to 0.6 n mi resolution. The data were displayed on the AFGL Man-computer Interactive Data Access System so that meteorologists could label small areas (25 x 25 n mi) with one of nine possible cloud categories from the AF 3D Nephanalysis Program (3DNEPH). The computer-based processor labeled the same areas by computing a two-dimensional fast Fourier transform (FFT) and comparing the results to average wavenumber spectra for the cloud categories. Classification accuracies were 65% for visible, 65% for IR and 81% for combined data. The classification accuracies were appreciably better than chance and a simplified processor which used only the averaged values of satellite data over an area. Accuracies improved is some categories were merged. The results were also compared to a cloud typing procedure in the 3DNEPH and to some earlier studies. The results were generally good for categories with small-scale cloud features such as cumulus or cirrus clouds, but the overall accuracy of classification for all cloud categories was not significantly better than verifications cited in earlier studies. Two potential refinements to the spectral processors, namely, removing the effects of backgrounds such as land, water, and snow cover and minimizing sensitivity to varying fractional cloud cover from case to case, are also discussed. (Author)

AD-A094 121/1 PC **A03**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Survey of Sensors for Automated Tactical Weather Observations.
Instrumentation papers,
Eugene Y. Moroz, and Frederick J. Brousaides.
25 Jun 80, 46p Rept nos. AFGL-TR-80-0195, AFGL-IP-288

Current requirements for tactical weather systems at fixed and bare-base airfields necessitate an upgrading of meteorological sensor capability, system automation, and a range of data dissemination options. A program has been initiated at the Air Force Geophysics Laboratory to implement these objectives. In the first phase of this program, a survey of the state-of-the-art has been made for the identification of equipment suitable for such a system. Government inventoried instrumentation, as well as those from commercial sources, have been considered. Criteria to be used in sensor selection will include both accuracy and the ability to operate trouble free over a wide range of environmental extremes. When appropriate, in-house programs will be initiated to correct deficiencies. During the coming year, field tests and intercomparisons will be made of selected sensors. Instrumentation will eventually be integrated into an automated system with local and/or remote display of weather elements tailored to user requirements.

AD-A094 133/6 PC **A02**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
A Variable Exposure Cloud Drop Sampling Device.
Mechanical engineering technical memo.,
F. W. Skidmore. May 80, 17p Rept no. ARL-MECH-ENG-TM-400

This report describes the design and operation of a variable exposure cloud drop sampling device, as used during Nomad anti-icing trials in Australia and in the United Kingdom. (Author)

AD-A094 141/9 PC **A02**/MF **A01**
Pennsylvania State Univ., University Park.
Analysis and Prediction of Severe Storms Environment,
Toby N. Carlson, Richard A. Anthes, Marc Schwartz, Stanley G. Benjamin, and Daniel G. Baldwin. 1980, 17p AFOSR-TR-80-1308
Contract N00014-78-C-0775, Grant AFOSR-79-0125
Pub. in Bulletin of the American Meteorological Society, v61 n9 p1018-1032 Sep 80. Sponsored in part by Grants, EPA-R-805659, NASA-NSG-5205 and NSF-ATM78-02699.

No abstract available.

AD-A094 207/8 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Research on Storm and Strong Convection Weather,
Tao Shi Yan, Ding Yi Hui, and Zhou Xiao Ping. 4 Dec 80, 36p Rept no. FTD-ID(RS)T-0937-80
Edited trans. of Scientia Atmospherica Sinica (China) v3 n3 p227-238 1979.

No abstract available.

AD-A094 272/2 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
A Comparative Analysis of Rawinsonde and Nimbus 6 and Tiros N Satellite Profile Data.
Reference publication,
James R. Scoggins, William E. Carle, Keith Knight, Vance Moyer, and Nine-Min Cheng. Jan 81, 84p NASA-RP-1070
Grant DAAG29-76-G-0078

This report addresses the question regarding the extent to which satellite sounding data can be used to determine atmospheric structure. Com-

parisons are made between rawinsonde and satellite profiles in seven areas for a wide range of surface and weather conditions. Variables considered consist of temperature, dewpoint temperature, thickness, precipitable water, lapse rate of temperature, stability, geopotential height, mixing ratio, wind direction, wind speed, and kinematic parameters, including vorticity and the advection of vorticity and temperature. In addition, comparisons are made in the form of cross sections and synoptic fields for selected variables. Sounding data from the NIMBUS-6 and TIROS-N satellites were used. The NIMBUS-6 data were linearly interpolated to obtain soundings coincident in time with the rawinsonde soundings. The TIROS-N data were obtained concurrently with the rawinsonde data, and no interpolation was performed. Results from the analysis of the discrepancies between satellite and rawinsonde data were similar for both types of satellite data. Biases were observed in both sets of satellite data as a function of altitude, and the discrepancies were approximately randomly distributed in the 1000-500, 500-300, and 300-100 mb layers. Geostrophic wind computed from smoothed geopotential heights provided large-scale flow patterns that agreed well with the rawinsonde wind fields. Surface wind patterns as well as magnitudes computed by use of the log law to extrapolate wind to a heighth of 10 m agreed well with observations. (Author)

AD-A094 273/0 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
Determination of Wind From Nimbus 6 Satellite Sounding Data.
Reference publication,
William E. Carle, and James R. Scoggins. Jan 81, 83p NASA-RP-1072
Grant DAAG29-76-G-0078

Objective methods of computing upper-level and surface wind fields from Nimbus-6 satellite sounding data are developed. These methods are evaluated by comparing satellite-derived and rawinsonde wind fields on gridded constant-pressure charts in four geographical regions. Satellite-derived and hourly observed surface wind fields are compared. Results indicate that the best satellite-derived wind on constant-pressure charts is a geostrophic wind derived from highly smoothed fields of geopotential height. Satellite-derived winds computed in this manner and rawinsonde winds show similar circulation patterns except in areas of small height gradients. Magnitudes of the standard deviation of the differences between satellite-derived and rawinsonde wind speeds range from approximately 3 to 12 m/s on constant-pressure charts and peak at the jet-stream level. Fields of satellite-derived surface wind computed with the logarithmic wind law agree well with fields of observed surface wind in most regions. Magnitudes of the standard deviation of the difference in surface wind speed range from approximately 2 to 4 m/s, and satellite-derived surface winds are able to depict flow across a cold front and around a low-pressure center.

AD-A094 328/2 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
An Improved Method for Obtaining the Water Content Values of Ice Hydrometeors from Aircraft and Radar Data,
Veron G. Plank, Robert O. Berthel, and Arnold A. Barnes, Jr. 5 Feb 80, 9p Rept no. AFGL-TR-81-0011
Pub. in Jnl. of Applied Meteorology, v19 n11 p1293-1299 Nov 80.

No abstract available.

AD-A094 480/1 PC **A06**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
Atmospheric Structure Determined from Satellite Data.
Reference publication,
Keith Shelburne Knight, and James R. Scoggins. Jan 81, 108p NASA-RP-1071
Grant DAAG29-76-G-0078

The capabilities of the Nimbus-6 satellite sounding data for use in synoptic analysis are considered and interpreted. An evaluation of the ability of the satellite sounding data to detect and depict structural features of the atmosphere is made on the basis of (1) vertical profiles of average difference and standard deviation of differences between satellite and rawinsonde data at nine pressure levels form 850 to 100 mb, and (2) constant-pressure charts and cross sections of satellite, rawinsonde, and difference values. Results indicate the (1) satellite measurements of temperature as well as the vertical lapse rate and horizontal gradient of temperature are accurate enough to show large-scale patterns but not to define fronts or tropopauses; (2) satellite measurements of dew-point temperature are smoothed enough to severely reduce contrasts between air masses across fronts; (3) the magnitude of the standard deviation of differences between rawinsonde and satellite data for most variables increases with the synoptic activity in the region; and (4) the most reliable variables to examine from satellite data for depiction of synoptic features are the temperature, lapse rate of temperature, equivalent potential temperature, mixing ratio. (Author)

AD-A094 481/9 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Dept. of Meteorology.
Comparisons between Nimbus 6 Satellite and Rawinsonde Soundings for Several Geographical Areas.
Reference publication,
Nine-Min Cheng, and James R. Scoggins. Jan 81, 77p NASA-RP-1073
Grant DAAG29-76-G-0078

Discrepancies between Nimbus-6 satellite and weighted rawinsonde data on 25 August 1975 and 3 September 1975 are examined over four geographical areas. Good agreement between satellite and weighted (linearly interpolated) rawinsonde temperature and temperature-derived parameters was found in most instances, with the poorest agreement either near the tropopause region or near the ground. However, satellite moisture data are highly questionable. The smallest discrepancy between satellite and weighted mean rawinsonde temperature and parameters derived from temperature was found over water, and the largest discrepancy was found over mountains. Cumulative frequency distributions show that discrepancies between satellite and rawinsonde data can be represented by a normal distribution except for dew-point temperature. (Author)

PB81-140931 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Ann Arbor, MI. Great Lakes Environmental Research Lab.
An Evaluation of Climatic Impact of the Niagara Ice Boom Relative to Air and Water Temperature and Winter Severity.
Technical memo.,
Frank H. Quinn, Raymond A. Assel, and Daniel W. Gaskill. Aug 80, 36p NOAA-TM-ERL-GLERL-30, GLERL-CONTRIB-232, NOAA-80111002

The objective of this study was to determine if the Niagara River ice boom installed every winter since 1964-65 has prolonged the Lake Erie ice cover at Buffalo, NY, resulting in significant changes in the spring warm-up of Lake Erie and longer, colder winters in the area. On the basis of the analysis presented in this report, there is no evidence that the operation of the ice boom has either extended Buffalo winters or made them more severe.

PB81-145146 PC **A05**
National Oceanic and Atmospheric Administration, Washington, DC. Environmental Data and Information Service.
Environmental Satellite Imagery, July 1979.
Apr 80, 100p KMRD-5.4-7909, NOAA-81010801
See also report dated Jun 79, PB80-181852. Key to Meteorological Records Documentation.

The Key to Meteorological Records Documentation (KMRD) No. 5.4 series is issued monthly to describe current cloud data obtained by NOOA's operational environmental satellites. It contains daily global satellite imagery in condensed form as a guide to data stored in the NOAA archive, and is designed to assist users in selecting data for research and climatological use.

PB81-145369 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration, Boulder, CO. Wave Propagation Lab.
Feasibility Study of Satellite-Borne Lidar Global Wind Monitoring System. Part II.
Technical memo.,
R. M. Huffaker, T. R. Lawrence, R. J. Keller, M. J. Post, and J. T. Priestley. Aug 80, 132p NOAA-TM-ERL-WPL-63, NOAA-80110706
See also report dated Sep 78, PB-293 879. Sponsored in part by Department of Defense, Washington, DC.

This detailed feasibility study for a satellite-borne pulsed coherent CO2 lidar at 800 km altitude for global wind monitoring shows that a tropospheric wind measurement error of < 1 m/s for typical operational parameters and of < 2 m/s for worst case models is possible. The required power, pointing precision, weight, data handling, and communication are within the capacity of the Space Shuttle or state-of-the-art add-on units. Lack of sufficient global aerosol data was identified as the principle unknown in the analysis.

PB81-147217 PC **A02**
National Environmental Satellite Service, Washington, DC.
Atmospheric Water Content Over the Tropical Pacific Derived from the Nimbus-6 Scanning Microwave Spectrometer,
N. C. Grody, A. Gruber, and W. C. Shen. Aug 80, 14p NOAA-80110715
Pub. in Jnl. of Applied Meteorology, v19 n8 p986-996 Aug 80.

The scanning microwave spectrometer (SCAMS) aboard Nimbus-6 contains a 22.23 GHz water vapor channel and 31.65 GHz window channel for deriving integrated water vapor (precipitable water) and cloud liquid water through a column over the oceans. The SCAMS derived parameters are based on a nonlinear relationship between the two channel measurements, and is shown to be more accurate than a linear model, particularly for the large values of precipitable water found in the tropics. Comparisons are made between SCAMS derived precipitable water and 163 radiosonde measurements collected from 19 island stations over the tropical Pacific for the period between 18 August and 4 September 1975.

PB81-801839 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Paleoclimatology. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 174p
Supersedes PB80-802549, and NTIS/PS-78/1285.

The cited reports describe studies of climate in the geologic past, and involve the interpretation of glacial deposits, fossils, and paleogeographical data. (This updated bibliography contains 166 citations, 12 of which are new entries to the previous edition.)

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A094 033/8 PC **A22**/MF **A01**
Booz-Allen and Hamilton, Inc., Bethesda, MD.

Review of Navy R&D Management 1946-1973,
Robert L. Hansen, Susan Frutkin, Peter Bruton, Sam Rothman, and Mary E. Ball. 1 Jun 76, 501p
Contract N00014-74-C-0251

This review was initiated by senior Navy officials who realized that the corporate memory of significant events in the evolution of Navy R&D management since World War II was rapidly diminishing. Management solutions, previously tried and found wanting, were beginning to reappear; the rationale behind others was blurred by the passage of time. While numerous case studies had been prepared on various projects and historical information figured prominently in several Navy management studies, there had been no systematic attempt to review and document the circumstances surrounding significant developments: the issues, the alternatives, and the decisions from which many major changes derived. Prior to initiating work the Navy Department agreed that, to the extent that they contribute to the objective of the review, the following subjects would be covered: Characteristics of each period within the era in terms of external and internal influences, issues, needs, key individuals, and management philosophy; Organization and its evolution in terms of structure, relationships, responsibilities, and authority; Principal policies and procedures and their influence on management efficacy; Important projects; their urgency and significance; Level of resources applied to R&D and trends therein; Noteworthy results, achievements, and failures; and Impact of above factors on R&D field activities and industry.

AD-A094 040/3 PC **A02**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
Factor Identification and Factor Score Estimation in Organizational Environments.
Technical rept.,
William H. Hendrix. Nov 80, 15p Rept no. AFIT-LS-4-80

A series of factor analyses were performed to extract organizational factors from data collected (N=4786) on Air Force personnel using the Organizational Assessment Package (OAP). The 22 factors extracted were orthogonally rotated and then each rotated factor had its internal consistency computed using the Cronbach Alpha technique. In order to reduce the number of items within the OAP, a factor score estimation methodology was developed. This included computing factor coefficients for use in deriving factor scores. Then a subset of items for each factor was regressed against factor scores as a means of factor score estimation. Factors, factor score coefficients, and factor score estimation results are presented. (Author)

AD-A094 218/5 PC **A05**/MF **A01**
Assistant Secretary of Defense (Communications, Command, Control and Intelligence), Washington, DC.
Final Report of the Software Acquisition and Development Working Group,
Victor E. Jones. Jul 80, 80p

It is common knowledge that software development projects rarely meet cost-benefits originally projected, usually cost more than expected, and are usually late. In addition, the software delivered seldom meets user requirements, oftentimes is not usable, or requires extensive rework. SADWG's analysis has shown that all facets of the software acquisition and development process need varying degrees of improvement. The analysis has also shown that software acquisition and development problems are not insurmountable, and that the remedy for most of these problems is better management at all levels of government. This remedy includes training software managers to effectively control programs, and providing managers with the proper tools to monitor the development process. In addition, there is a need to improve cost and schedule estimating at all phases of project development, improve the productivity of software development projects, and bring the maintainability of software systems within reasonable cost limits.

AD-A094 251/6 PC **A03**/MF **A01**
National Defense Univ., Washington, DC. Research Directorate.
Construction Support for Mobilization: A National Emergency Planning Issue,
Edward G. Rapp. Dec 80, 47p Rept no. NATL SEC AFFAIRS MONO-80-9

This fourth monograph, published under the auspices of the National Defense University, has as its target audience national emergency planners, policymakers, and lawmakers external to the Corps of Engineers. The purpose is to crystallize and illuminate through historical inference some significant deficiencies in the current state of national emergency preparedness.

AD-A094 256/5 PC **A03**/MF **A01**
Cornell Univ., Ithaca, NY. School of Operations Research and Industrial Engineering.
Coordination of Production Schedules with Shipping Schedules. Revision.
Technical rept.,
Williams L. Maxwell, and John A. Muckstadt. 15 Sep 79, 38p Rept no. TR-422-REV
Contract N00014-75-C-1172
Revision of Rept. no. TR-422 dated Apr 79, AD-A071 139.

Scheduling logistics operations in a multi-echelon production system requires planning and coordination of production and transportation decisions. In this paper we show how these decisions can be made in an economical manner for a real situation involving (a) limited capacity production lines in an automotive component plant, (b) a limited shipping capability at the component plant, and (c) meeting shipping requirements on time for several automobile assembly plants over the planning horizon. The nature of the production process and the rail car loading facility allow an aggregation of decisions concerning products to decisions concerning rail car units, reducing substantially the dimensionality of the problem. The resulting model is a special case of multi-commodity network flow problem. A two-phase heuristic solution procedure is developed, first for weekly aggregated demand and then for shift-by-shift aggregate demand within the first week of the horizon. Finally, the straightforward details of disaggregating into production and shipping schedules for products are presented. (Author)

AD-A094 446/2 PC **A08**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
An Investigation of the Effect of Production Rate Variation on Direct Labor Requirements for Missile Production Programs.
Master's thesis,
Scott C. Allen, and Charles M. Farr. Jun 80, 164p Rept no. AFIT-LSSR-42-80

The addition of the production rate variable to the standard learning curve model has been studied extensively, and has been validated as a significant technique in estimating direct labor hours for airframes, avionics equipment, and aircraft engines. This research set out to determine if the technique was applicable to air-launched missiles. The Maverick and Short Range Attack Missile (SRAM) production programs were evaluated yielding overall good results. Addition of the production rate variable contributed significantly to model estimating capabilities. It also significantly reduced auto-correlation of residuals in almost every case, thus enhancing the model's appropriateness for the data studied. The model could be useful in many missile production programs, but the specific program must be individually evaluated prior to model application. Model improvements were also implemented to reduce computer runtime, increase model flexibility, and provide residual analysis statistics. (Author)

AD-A094 541/0 PC **A04**/MF **A01**
Naval Sea Systems Command, Washington, DC.
Contracting and Management Guide for Sneak Circuit Analysis (SCA).
Sep 80, 58p Rept no. NAVSEA-te001-aa-gyd-010/sca

This guide presents a description of the Sneak Circuit Analysis (SCA) with primary emphasis on its purpose and potential benefits, as well as cost factors andc trade-offs. It is not the intent of the guide to define the exact methods or techniques for the performance of the analysis. The following topics relating to the SCA are addressed: What is a Sneak Circuit Analysis. Why would the SCA be performed. Who performs/participates in the SCA. When should the SCA be performed. How is the SCA ordered and managed. What are the associated cost factors.

AD-A094 550/1 PC **A09**/MF **A01**
Naval Postgraduate School, Monterey, CA.
OMB A-76: Full Costing and Its Impact at Installation Level within the U.S. Army.
Master's thesis,
Grant G. Hintze. Sep 80, 179p

This thesis evaluates the methods for accumulating costs attributable to the overhead pools of an Army in-house estimate for Government performance of Commercial or Industrial Type Activities (CITA). The full costing requirements of Office of Management and Budget (OMB A-76) of March 1979 is investigated vis-a-vis its impact at the installation level within the Army. Initial discussion addresses the evolution of the comparative cost analysis as a basis for in-house operation of a CITA function and explores the guidance provided by OMB, the Department of Defense, and the Department of the Army (DA). The concept of 'full cost' was reviewed as used by private industry. A case was developed around Government contractors, and nonprofit organizations. A major DA installation was used to illustrate the cost accumulation process and sources of cost data available to a typical DA installation. It was concluded that collection of relevant cost data to support CITA cost analysis was unnecessarily tedious and time consuming; and two steps were recommended to improve this process. (Author)

AD-A094 552/7 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Organizational Analysis Model for Navy Field-Level Comptrollership.
Master's thesis,
James Edgar Pledger. Sep 80, 154p

This thesis presents a look into the organizational behavior aspects of Navy field level comptrollership and presents an organizational analysis model designed to assist the new comptroller in transitioning into the new job. A brief history of comptrollership in the Navy is presented followed by a description of the model. Basically, the model states the optimal structural characteristics of the organization (such as span of control or centralization) can be determined from a study of the organization's technological and environmental characteristics; that optimal leadership styles can be derived from an examination of individual characteristics of the leader, the followers and the situation; and that appropriate decision making methods are associated with different environments of decision making. The overall operating environment is considered to have both direct and indirect effects on all other variables in the model. Data obtained from a survey of actual Navy field comptrollers verified the correctness of the model with noted reservations and indicated a substantial need for this type of research. (Author)

AD-A094 572/5 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
AIRTOURS: Application of an Interactive Computer Model to Analyze the Manpower Requirements and Operational Tour Opportunities of the Aviation Warfare Community.
Master's thesis,
Michael Lynn Scholes. Dec 80, 217p

This thesis presents application of an interactive computer model designed for more efficient utilization of available manpower within the Aviation Warfare Community. Officer Master Billet File data are analyzed for the purpose of determining relevant aviation input parameters in five aviation subcommunities, including prop pilots, prop NFO's, jet pilots, jet NFO's, and helo pilots. Specific operational tour structures are defined for each subcommunity and current information for officer inventory and operational billet requirements is used to calculate operational and command tour opportunities or shortfalls for specific tour positions over projected fiscal years for each subcommunity. Model capability is demonstrated by adjusting organization requirements, billet requirements, grade requirements, and tour positions. The model con-

firms serious aviation shortfalls and provides analysts with the ability to test various manpower planning alternatives. (Author)

AD-A094 576/6 PC **A03**/MF **A01**
Defense Communications Agency, Arlington, VA.
Communications Services Industrial Fund (CSIF).
Jul 76, 36p Rept no. DCA-CIRC-600-70-1
Includes errata sheet dated 20 Mar 79.

This Circular establishes the policy, delineates responsibility, and prescribes procedures required by Headquarters, DCA for the effective management of the Communications Services Industrial Fund (CSIF). This Circular explains actions required in relation to program and budget review and the policy and procedures to be used in the reimbursement of DCS operation and maintenance costs from the CSIF. This Circular also assists customers of the CSIF in reporting resources data to DCA in accordance with established Reports Control Symbol (RCS) procedures.

PB81-139636
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
East and West, the Twain Do Meet at IIASA,
R. E. Machol. 30 Jun 80, 6p
Included in European Scientific Notes, v34 n6 p304-309, 30 Jun 80.

The article describes the work of the international research group, International Institute for Applied Systems Analysis, based in Vienna and staffed by scientists of all countries.

PB81-144107 PC **A07**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Section 8 Subsidized Housing--Some Observations on Its High Rents, Costs, and Inequities.
Report to the Congress.
6 Jun 80, 147p CED-80-59

Like the subsidized housing programs which preceded it, the Department of Housing and Urban Development's Section 8 Rental Assistance Program is costly and serves only a fraction of the millions of households in need. Since its inception in 1974 the program's rents and costs have risen at rapid rates and to significant levels. While much of this increase is justified in light of housing market conditions, a portion of it is the result of program or administrative weaknesses. There are no easy or inexpensive solutions to the problem of providing housing assistance to the poor but efforts must be made to ensure that available dollars are spent in ways that allow meaningful assistance to be provided to the maximum number of households. There are some actions the Secretary of Housing and Urban Development can take to hold down individual unit costs of section 8, provide greater program equity, and create a more acceptable program image.

PB81-144420 PC **A09**/MF **A01**
General Accounting Office, Washington, DC. Energy and Minerals Div.
Electricity Planning - Today's Improvements Can Alter Tomorrow's Investment Decisions.
Report to the Congress.
30 Sep 80, 190p EMD-80-112

The report discusses the States' and utilities' responsibilities in determining the need for future electrical generating capacity, analyzes their electric planning capabilities and practices, describes Federal agencies' electrical planning roles, and cites how Federal/State/utility planning responsibilities can be improved. The review was conducted due to the importance and long-lasting effects of electricity planning.

PB81-146680 PC **A04**/MF **A01**
Office of Management and Budget, Washington, DC. Federal Program Information Branch.
Catalog of Federal Domestic Assistance, 1980 (Second Update). Magnetic Tape Documentation,
Robert Brown. Dec 80, 72p OMB/DF-81/001A
For system on magnetic tape, see PB81-146672.

The file reflects all the textual material published in the program descriptions section of the Catalog of Federal Domestic Assistance (1980). There are 1,176 programs. In addition, a 'characteristics record' is included for each program.

PB81-147050 PC **A03**/MF **A01**
Federal Deposit Insurance Corp., Washington, DC.
A Guide for Security Control and Auditing of In-House Mini Computers (The Community Bank Automation Series),
Joan L. Tarwater. Dec 80, 38p

The booklet is intended for the managers and auditors of small financial organizations where automated data processing is of control and security concerns in laymen's terms and provides detailed suggestions for tailoring and administering an EDP audit program.

PB81-149460 Not available NTIS
National Bureau of Standards, Washington, DC.
Standards and Guidelines for Data,
P. W. Berger, and J. C. Tucker. 1980, 21p
Pub. in Chapter 8 in Data Handling for Science and Technology, an Overview and Sourcebook, p93-113 1980.

Measurements are made to establish hypotheses, control industrial processes, aid health care, and set standards. These measurements must be precise and must also be compatible. Standard reference data systems provide critically evaluated numerical values of physical and chemical properties. Standard reference materials with accurately assessed properties provide means for comparison of instruments and methods. Engineering and product standards are written by national and international organizations to assure quality and compatibility of industrial output. Finally, major international attention has been focused on standardization of information processing. In addition to describing these levels of standardization, the chapter describes some of the standards organizations in various countries and gives an extensive bibliography.

PB81-149551 PC **A04**/MF **A01**
Central Puget Sound Economic Development District, Seattle, WA.
Trident Community Impact Assessment Project, Final Report, Kitsap County, Washington.
Dec 80, 52p EDA-81-004
Grant EDA-07-06-01481-26

This is the final report on a project by the Central Puget Sound Economic Development District. The project period was February 1974 through February 1977. The project was formulated in response to the substantial impacts anticipated from the Navy's decision to locate its Trident Submarine Support Base at the Bangor Reservation, Kitsap County, Washington. Construction of the Trident submarine base will cause rapid population growth in Kitsap County. Extensive planning to accommodate the new population is essential. The study's primary purpose was to determine the effects of Trident and different patterns of future growth on the costs of essential public services.

PB81-158537 PC **A06**/MF **A01**
Office of Management and Budget, Washington, DC. President's Reorganization Project.
Organizing for Development; Reorganization Study of Federal Community and Economic Development Programs.
Final rept.
Feb 79, 116p

In June of 1977, President Carter directed his Reorganization Project in the Office of Management and Budget to undertake a thorough review of the organization and structure of the major Federal local development programs and to recommend ways to improve the operation of these critical Federal activities. In response to this directive, a study staff assembled from the affected Federal agencies, state and local governments, and the private sector analyzed the operations of these programs, interviewed dozens of program users and administrators, and explored a variety of potential organizational and programmatic improvements.

PB81-158552 PC **A18**/MF **A01**
Office of Management and Budget, Washington, DC.
Eligibility Simplification Project: An Interagency Study with Recommendations for Simplifying Client Eligibility among Major Public Assistance Programs.
Oct 80, 405p

On December 13, 1978, President Carter called for an interagency review to simplify and streamline the eligibility policies which directly affect millions of needy individuals and families to produce recommendations which will lead to more consistent and less burdensome government-wide practices to make the eligibility determination process simple, understandable and efficient. Such improvements could also lead to better quality services for those who are eligible to receive them.

PB81-802704 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Revenue Sharing. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 125p
Supersedes PB80-802556, and NTIS/PS-78/1293.

The bibliography contains annotated references to research reports concerning revenue sharing at local, state, and Federal levels. Both general and specific studies are included. (This updated bibliography contains 113 citations, 18 of which are new entries to the previous edition.)

PB81-856049 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Puerto Rico: Health, Education, Employment, and Miscellaneous Statistics. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Dec 80, 140p NERACUSGNT2665
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning studies, surveys, programs, planning, statistical data and analyses relating to Puerto Rican health, education and employment, and miscellaneous topics of interest to both public and private organizations and operations. Military facilities and activities are excluded. (Contains 114 citations, fully indexed and including a table of contents.)

5B. Documentation and Information Technology

AD-A094 125/2 PC **A03**/MF **A01**
Army Natick Research and Development Labs., MA.
Bibliography of Technical Publications and Papers, October 1979 - September 1980.
Annual rept.
Nov 80, 40p Rept no. NATICK/TR-81/001

This report contains a bibliographic listing of technical publications and papers presented by personnel of the US Army Natick Research & Development Laboratories and its contractors for the period October 1979 through September 1980. (Author)

AD-A094 150/0 Not available NTIS
Universidad Nacional Autonoma de Mexico, Mexico City. Inst. de Geofisica.
Geofisica Internacional, Volume 18, Number 2, 1 April 1979,
G. K. Hartmann, E. A. Lubimova, R. M. Prol, Hector Grandoso, and W. Ritter Ortiz. 1979, 128p
Availability: Universidad Nacional Autonoma de Mexico, Mexico City, Mexico. Instituto de Geofisica (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 259/9 PC **A04**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.

Design Achievements of the Command Center Information Subsystem (CCIS), A Dynamic and Extensible Computing System for Natural Language Understanding of Navy Command Center Information.
Technical rept.,
D. L. Small, and D. O. Christy. 30 Aug 80, 61p
Rept no. NOSC/TR-581

CCIS is a revolutionary new hardware and software system for Navy data management, giving a command center the capability for providing high quality information to its commander as an aid in his decision making. It allows processing of natural language queries to proceed at the same time as dynamic data update. It provides extensibility so that the computer can 'understand' the commander's individualized description of data received in the command center from standard static and dynamic sources. It also allows those dynamic sources to be customized uniformly to the particular command center. (Author)

AD-A094 376/1 PC **A06**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Science and Technology Div.
Improvement of Access to DoD Scientific and Technical Information. Part A. Background Information.
Rept. for Dec 79-Dec 80,
Murray E. Kamrass, and Vincent J. Berinati. Dec 80, 109p IDA-P-1537-PT-A, IDA/HQ-80-22919, AD-E500 238
Contract MDA903-79-C-0320
See also Part B, AD-A094 377.

The regulations governing the implementation of DTIC are reviewed and lack of enforcement is found to be a primary factor in denying to DTIC about fifty percent of the information that should be in the files. A survey of DROLS users indicates that nearly all classified users would be unhappy about a change to a completely unclassified system, although the real benefits of the classified system are small, considering recent and pending improvements to the unclassified system. In addition, an unclassified system would be less expensive to operate for DTIC, the DoD and the users. The question of the value of information is partially addressed in this report, but a definitive answer is not found. The attitude of classified users is that the information they receive is well worth its present costs. For this reason, a completely unclassified on-line system is not recommended as a result of this study.

AD-A094 377/9 PC **A05**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Science and Technology Div.
Improvement of Access to DoD Scientific and Technical Information. Part B. Analyses, Findings and Conclusions.
Rept. for Dec 79-Dec 80,
Murray E. Kamrass, and Vincent J. Berinati. Dec 80, 76p IDA-P-1537-PT-B, IDA/HQ-80-23090, AD-E500 239
Contract MDA903-79-C-0320
See also Part A, AD-A094 376.

The regulations governing the implementation of DTIC are reviewed and lack of enforcement is found to be a primary factor in denying to DTIC about fifty percent of the information that should be in the files. A survey of DROLS users indicates that nearly all classified users would be unhappy about a change to a completely unclassified system, although the real benefits of the classified system are small, considering recent and impending improvements to the unclassified system. In addition, an unclassified system would be less expensive to operate for DTIC, the DoD and the users. The question of the value of information is partially addressed in this report, but a definitive answer is not found. The attitude of classified users is that the information they receive is well worth its present costs. For this reason, a completely unclassified on-line system is not recommended as a result of this study.

AD-A094 421/5 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Management of Water Quality Data Within the Corps of Engineers, 1979.
Final rept.,
Margaret H. Smith, and Phillip L. Doiron. Dec 80, 84p Rept no. WES/MP/E-80-2

This report contains the results of a survey of current practices, needs, and recommendations in water quality data management by the Corps of Engineers Districts and Divisions. Reviews of the data management systems in use and others with potential for use by the Corps are included. Also included are recommendations for a system selection procedure for consideration in the event a Corps-wide data management system is implemented. (Author)

FIPS PUB 76 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC.
Guideline for Planning and Using a Data Dictionary System. Category: Software. Subcategory: Data Management Applications.
Federal information processing standards (Final). 20 Aug 80, 20p
Three ring FIPS binder also available, North American Continent price $6.25; all others write for quote.

The guideline provides assistance to Federal ADP management and technical staff in planning and using a Data Dictionary System (DDS). A DDS is a computer software system that is used to assist in organization-wide data management, without restriction to computer data. This document describes the capabilities of a DDS; addresses selection considerations; provides guidance for pre-implementation planning, including such management issues as DDS policies and budgeting, data standardization and control, and coordination of the DDS contents. The document also presents initiation and operation considerations for using a DDS.

INIS-mf-5426 PC **A02**/MF **A01**
Bandung Reactor Center (Indonesia).
Proceedings of the Workshop on Physics, Nuclear Instrumentation and Isotope Production, Bandung, Oct 17-18, 1977.
1977, 20p PRAB-632/Sem-66/77, CONF-7710233-(V.2)
In Indonesian.Workshop on physics, nuclear instrumentation and isotope production, Bandung, Indonesia, 17 Oct 1977.
U.S. Sales Only.

A determination of the adsorption capacity of neutral aluminium oxide for molybdenum at various pH, the effect of heating on this adsorption capacity and the effect of eluation with a 0.9% sodium chloride solution on the adsorbed molybdenum has been carried out. The adsorbed molybdenum was determined by spectrophotometry of the unadsorbed molybdenum as thiocyanate complex. (Atomindex citation 11:530979)

PB80-217003 PC**$40.00**/MF**$40.00**
National Technical Information Service, Springfield, VA.
A Directory of Computerized Data Files and Related Technical Reports.
1980, 404p

During the past ten years, there has been a tremendous increase in the number of machine-readable data files produced by the Federal Government. The files are among the principal products prepared from Federal programs costing billions of dollars. Many of the files are prepared specifically for public dissemination and use while others have been regarded as by-products to printed reports or research. Due to the increasing sophistication and capability of data users to store and process data using computer facilities, the expanding volume of Federal machine-readable data products have been accompanied by a growth in public demand for these files and assistance in their acquisition and use. NTIS has in its inventory almost 400 data files recorded on magnetic tape. This Directory is published for the convenience of potential users of these data files. Its purpose is to provide descriptive information on the availability and content of these machine-readable data files which may be acquired by the public. NTIS prepares and updates the Directory abstracts and corresponding indexes based on information provided by the Federal agencies which are the source of these files. It is intended that this will be a biennial publication.

PB81-134850 PC **A08**/MF **A01**
Duke Univ. Medical Center, Durham, NC.
Expansion, Extension, and Evaluation of a Clinical Databank for Coronary Artery Disease: Volume I - Final Report.
Rept. for 30 Sep 76-30 Jun 80,
Robert A. Rosati, V. S. Behar, P. C. Elliott, F. E. Harrell, Jr., and P. J. Harris. Aug 80, 152p
NCHSR-81-33
Contract PHS-HRA-230-76-0300
Prepared in cooperation with Harvard School of Public Health, Boston, MA. See also Volume II, PB81-134868.

The study objective was to evaluate and continue to develop a clinical data bank for coronary artery disease and test its transferability to another institution. The current databank was extended and modified for operation in ambulatory settings. The evaluation tested the effect of the databank on the efficacy of treatment, patient outcomes, costs, and provider productivity. The system is to be instituted in another institution in order to evaluate the feasibility of extending it to other hospitals and of pooling from multiple sources information based on common definitions and procedures. By aggregating, analyzing, and making the clinical experiences of a large number and variety of patients available to the individual physician, chronic disease data banks have the potential to improve the individualization of therapies and the accuracy of prognoses.

PB81-134868 PC **A17**/MF **A01**
Duke Univ. Medical Center, Durham, NC.
Expansion, Extension, and Evaluation of a Clinical Databank for Coronary Artery Disease: Volume II - Appendices.
Final rept. 30 Sep 76-30 Jun 80,
Robert A. Rosati, V. S. Behar, P. C. Elliott, F. E. Harrell, Jr., and P. J. Harris. Aug 80, 382p
NCHSR-81-34
Contract PHS-HRA-230-76-0300
Prepared in cooperation with Harvard School of Public Health, Boston, MA. See also Volume I, PB81-134850.

Contents:
- Data Collection Forms for the CAD Databank Inpatient Information System;
- Examples of Medical Reports Produced for the Patient's Record by the CAD Databank Computer Support System;
- CAD File Documentation;
- NEWMIRU File Documentation;
- Description of the Computer Information System That Supports the DUMC Coronary Artery Disease Databank;
- Description of the Cox Survival Model and the Mantel-Haenszel Test for Survivorship;
- Quality of Life Interview Schedules;
- A Preliminary Technology Assessment of Clinical Information Systems.

PB81-136582 PC **A04**/MF **A01**
Office of Naval Research, London (England).
European Scientific Notes. Volume 34, Number 1, 31 January 1980,
Willard D. Bascom, Robert E. Machol, and Dodie Thomas. 31 Jan 80, 56p ESN-34-1

Contents: Calorimetry and thermal analysis, a microsymposium at Macro; Chemistry in Scandinavia; What's new in cathode ray tube displays; Graz - the technical university--visits to communications and biomedical engineering; Practical experiences with flow-induced vibrations; The Department of Mechanics at the University of Oslo; The Institute for Thermodynamics and Fluid Dynamics at the Chalmers Tekniska Hogskola; Physical chemistry applied to problems of metals; Polymer and surface science at Strasbourg and Strathclyde; Steel research centers in Paris and Rome; American-Irish radiology symposium; Cystourethrography in congenital anomalies of the lower urinary tract; Wind and more wind; Measurement, calibration, and standards; Ocean engineering at Heriot-Watt University; Care in society--Sweden; Operations research in the Swedish Defence Department; Injection lasers--research to product.

PB81-139610
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).

Physics, Peace and Pyramids in Egypt--Part I,
R. S. Hughes. 30 Jun 80, 5p
Included in European Scientific Notes, v34 n6 p300-303, 30 Jun 80.

This is Part I of a two-part article, and contains the highlights of visits to Alexandria University, the Military Technical College and the institute at Helean. In addition to the highlights of these discussions, this report contains some observations on the peace Egypt is presently enjoying, the exporting of skills from that country, and some general comments on the educational process and research environment as they exist there.

PB81-144016 PC **A02**/MF **A01**
National Research Council, Washington, DC.
Summary of Activities of the Aeronautics and Space Engineering Board.
Final rept. 15 May 67-30 Sep 80.
Oct 80, 20p
Contract NASw-2342

The report contains a summary of activities of the Aeronautics and Space Engineering Board from May 15, 1967 to September 30, 1980 including names, year, and term of appointments of all chairmen and members of the board; dates and location of all meetings of the board; titles of all ad hoc committees established under the board, with dates and locations of meeting of each; and titles and dates of reports of the board and its ad hoc committees.

PB81-149338 Not available NTIS
National Bureau of Standards, Washington, DC.
Electrolyte Data Center,
Bert R. Staples. Apr 79, 1p
Pub. in SSIE Science Newsletter VIII, n6 p5 Apr 79.

A short description of the activites and kinds of output of the Electrolyte Data Center, NBS, is provided.

PB81-802878 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Management Information Systems. November, 1977-January, 1981 (Citations from the NTIS Data Base).
Rept. for Nov 77-Jan 81.
Jan 81, 195p
Supersedes PB80-802739, and NTIS/PS-78/1069. See also 1964-October, 1977, NTIS/PS-78/1068.

The bibliography includes general studies as well as application studies in the fields of transportation, education, personnel management, and military sciences. Reports concerning urban management information systems and application studies in the health/medical fields are excluded. (This updated bibliography contains 190 citations, 64 of which are new entries to the previous edition.)

5C. Economics

AD-A094 312/6 PC **A03**/MF **A01**
George Washington Univ., Washington, DC. Program in Logistics.
Kalman Filter Techniques for Control of Repeated Economic Surveys.
Scientific rept.,
Wray Smith, and Zeev Barzily. 30 Sep 80, 28p
Rept no. SERIAL-T-428
Contract N00014-75-C-0729

In this paper we discuss the determination of sample sizes and intersurvey intervals in repeated economic surveys. Three models are discussed. The first two maintain the intersurvey intervals at a constant length while the third allows the intersurvey intervals to vary in length. In the first model we assume that the number of obtained observations in each survey is equal to the number of designated observations. The second and third models assume that the number of obtained observations is a random variable. The costs which are taken into account are the fixed and varying costs of surveying and a cost which is due to the use of estimates from the repeated surveys. (Author)

AD-A094 357/1 PC **A10**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 1. Study Summary.
Final rept.
Dec 80, 220p
Contract DACW69-78-C-0136
See also Volume 2, AD-A094 358.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 358/9 PC **A06**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 2. Methodology.
Final rept.
Dec 80, 125p
Contract DACW69-78-C-0136
See also Volume 3, AD-A094 359.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and preesnt waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 359/7 PC **A07**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 3. Group I. Coal & Coke.
Final rept.
Dec 80, 141p
Contract DACW69-78-C-0136
See also Volume 4, AD-A094 360.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commence and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 360/5 PC **A04**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume. Group II. Petroleum Fuels.
Final rept.
Dec 80, 70p
Contract DACW69-78-C-0136
See also Volume 5, AD-A094 361.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 361/3 PC **A03**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 5. Group III. Crude Petroleum.
Final rept.
Dec 80, 46p
Contract DACW69-78-C-0136
See also Volume 6, AD-A094 362.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 362/1 PC **A04**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 6. Group IV. Aggregates.
Final rept.
Dec 80, 71p
Contract DACW69-78-C-0136
See also Volume 7, AD-A094 363.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 363/9 PC **A07**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 7. Group V. Grains.
Final rept.
Dec 80, 132p
Contract DACW69-78-C-0136
See also Volume 8, AD-A094 364.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 364/7 PC **A05**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 8. Group VI. Chemicals & Chemical Fertilizers.
Final rept.
Dec 80, 94p
Contract DACW69-78-C-0136
See also Volume 9, AD-A094 365.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 365/4 PC **A04**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.

Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 9. Group VII. Ores and Minerals.
Final rept.
Dec 80, 62p
Contract DACW69-78-C-0136
See also Volume 10, AD-A094 366.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 366/2 PC **A06**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 10. Group VIII. Iron Ore, Steel and Iron.
Final rept.
Dec 80, 104p
Contract DACW69-78-C-0136
See also Volume 11, AD-A094 367.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 367/0 PC **A03**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 11. Group IX. Feed and Food Products, NEC.
Final rept.
Dec 80, 50p
Contract DACW69-78-C-0136
See also Volume 12, AD-A094 368.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 368/8 PC **A04**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 12. Group X. Wood and Paper Products.
Final rept.
Dec 80, 66p
Contract DACW69-78-C-0136
See also Volume 13, AD-A094 369.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 369/6 PC **A03**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 13. Group XI. Petroleum Products, Nec.
Final rept.
Dec 80, 43p
Contract DACW69-78-C-0136
See also Volume 14, AD-A094 370.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 370/4 PC **A03**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 14. Group XII. Rubber, Plastic, Nonmetallic Mineral Products, Nec.
Final rept.
Dec 80, 46p
Contract DACW69-78-C-0136
See also Volume 15, AD-A094 371.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 371/2 PC **A04**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 15. Group XIII. Nonferrous Metals and Alloys, Nec.
Final rept.
Dec 80, 63p
Contract DACW69-78-C-0136
See also Volume 16, AD-A094 372.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 372/0 PC **A03**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 16. Group XIV. Manufactured Products, Nec.
Final rept.
Dec 80, 39p
Contract DACW69-78-C-0136
See also Volume 17, AD-A094 373.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 373/8 PC **A04**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Volume 17. Group XV. Others, Nec.
Final rept.
Dec 80, 55p
Contract DACW69-78-C-0136
See also Volume 1, AD-A094 357.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projects of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity groups and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 374/6 PC **A02**/MF **A01**
Nathan (Robert R.) Associates, Inc., Washington, DC.
Projections of Demand for Waterborne Transportation, Ohio River Basin, 1980, 1990, 2000, 2020, 2040. Executive Summary.
Final rept.
Dec 80, 22p
Contract DACW69-78-C-0136
See also AD-A094 357.

This Corps of Engineers report describes one of three independent but complementary studies of future freight traffic on the Ohio River Basin Navigation System. Each of the studies considers existing waterborne commerce and develops a consistent set of projections of future traffic demands for all of the navigable waterways of the Basin. Each report contains information on past and present waterborne commerce in the Basin and projections by commodity group and origin-destination areas from 1976 to at least 1990. (Author)

AD-A094 594/9 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Econometric Analysis of Arms Transfers to the ASEAN Countries.
Master's thesis,
Sapto J. Poerwowidagdo. Sep 80, 86p

An econometric analysis was carried out on military expenditures and arms imports data for ASEAN (Association of Southeast Asia Nations) countries using both single and simultaneous equation models. A forecasting model was developed following the econometric model. Both models were applied to actual arms transfers data for observations during 1968-1976. The empirical result of the econometric model demonstrated the simultaneity of the two variables above and the result of the forecasting model encouraged the use of the lagged variables to predict the values of military expenditures and arms imports. Both models are useful in the policy analysis of the arms transfers within the ASEAN countries. (Author)

DIB-81-02-500 PC**$10.00**/MF **A01**
International Trade Administration, Washington, DC.
Petrochemical Industry in Portugal.
Foreign market survey rept.
20 Aug 80, 63p
U.S. sales only for 8 months. Available to foreign addressees in Oct 81.

The market research was undertaken to study the present and potential US share of the market in the petrochemical industry in Portugal; to examine growth trends in Portuguese end-user industries over the next few years; to identify specific product categories that offer the most promising export potential for US companies; and to provide basic data which will assist US suppliers in determining current and potential sales and marketing opportunities. The trade promotional and marketing techniques which are likely to succeed in Portugal were also reviewed.

PB81-135428 PC **A02**/MF **A01**
Illinois Dept. of Commerce and Community Affairs, Springfield.
State of Illinois Department of Commerce and Community Affairs Activities Report, February 1978 through September 1979.
Dec 80, 13p EDA-81-002

Grant EDA-06-06-01640

The report outlines the economic development activities of the Illinois Department of Commerce and Community Affairs for the period beginning February 1978 through September 1979. The project's objective was to assist Illinois local governments, local development organizations and economic development districts create jobs and investment through State and Federal programs.

PB81-140576 PC **A07**/MF **A01**
Blackfeet Tribe, Browning, MT.
The Blackfeet Log Home Mill Feasibility Study.
Final rept.
Dec 80, 136p EDA-80-0204
Grant EDA-05-06-01901
Prepared by Management Task Force, Inc., Denver, CO.

The purpose of this project was to provide the Blackfeet Tribal Council with the information necessary to maximize the Tribe's timber yield and related income. The specific projects under consideration were the feasibility of a log home mill operation which would utilize the Tribe's timber resources. The first phase of the report focused on the feasibility of the mill operation. The second area of the report was concerned with developing a viable operational plan for the proposed business.

PB81-141632 PC **A11**/MF **A01**
ICF, Inc., Washington, DC.
Economic Impact Analysis of Proposed Section 5 Notice Requirements. Part I: Analysis of the Impacts on the Chemical Industry of Proposed Section 5 Notice Requirements. Part II: Issue Papers,
Robert Dresser, James Edwards, Joseph Kirk, and Stuart Fribush. Sep 80, 240p EPA-560/12-80-005
Contract EPA-68-01-5878

This report presents the analysis of the economic impact of TSCA section 5 rules on the chemical industry. The industry will be impacted when it introduces new chemicals. Of the six distinguishable consequences for the chemical industry, the most important are the nonquantifiable uncertainty consequences. The more unclear EPA's rationale in making section 5 notice decisions, the greater are the uncertainties. There will likely be a short-run drop in the number of new chemicals introducted into commerce as chemical companies shift their innovation activities into 'safe' chemicals. Current data do not allow a quantitative estimate to be made of the rate of chemical introductions, or the extent of the reduction caused by the section 5 notice requirements; and, even if the data were available, it is doubtful that accurate quantitative predictions could be made. Smaller companies will face greater uncertainties and the direct costs will more often be a factor in company decisions. In the long run, this requlation may cause the chemical industry to be composed of a fewer number of larger competitors better able to absorb the direct costs and regulatory uncertainty associated with the requirement.

PB81-143331 PC **A07**/MF **A01**
Williams and Works, Sanford, NC.
Northampton County Industrial Park Feasibility Study, Northampton County, North Carolina.
Nov 80, 130p EDA-81-001
Grant EDA-04-06-01828

An industrial park feasibility study includes many elements that are common to the comprehensive planning process. First, basic socio-economic and natural resources information is examined to determine the need for further industrial development. This information is reviewed and analyzed by the Economic Development Commission and combined with local industrial development goals and objectives. This information is used as a base for identifying potential sites that are 50 acres or more in size. The sites are then analyzed to determine the suitability for industrial development. The most suitable sites are then examined in detail and a final selection is made. Options or controls for the site are obtained and more detailed examinations are made. A Master Plan then is prepared. The last phase is implementation of the Master Plan and its supporting requirements.

PB81-144123 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Financial and General Management Studies Div.
Government Measures of Private-Sector Productivity: Users Recommend Changes.
Report to the Congress.
8 Jul 80, 68p FGMSD-80-45

The report discusses improvements needed in the productivity statistics published by the Department of Labor's Bureau of Labor Statistics. It also discusses the Department of Commerce role in productivity measurement.

PB81-144438 PC **A15**/MF **A01**
Cornell Univ., Ithaca, NY.
Ethanol Production in Northern New York: Technical and Economic Feasibility.
Final rept. Apr-Sep 80,
Robert J. Kalter, Richard N. Boisvert, Eric C. Gabler, Larry P. Walker, and Roger A. Pellerin.
Sep 80, 336p NYSERDA-80-22

The report examines the technical and economic viability of converting cheese whey to ethanol, at a variety of scales and with two alternative technologies. In addition, the use of corn as a supplementary feedstock to extend economies of scale is investigated. For the scales of operation and potential locations studied (New York State's North Country Counties Lewis, Jefferson, St. Lawrence and Franklin), whey conversion was found to be feasible and profitable, using presently available equipment and techniques. In the North County alone, more than one billion pounds of cheese whey is left over from the manufacture of cheese annually. The whey has been a costly disposal problem for manufactures. It is estimated that waste could be turned into 2.5 million gallons of ethanol. Ethanol, when blended with unleaded gasoline in a 9:1 ratio, produces gasohol, an octane booster and a gasoline extender. This is the first of five region specific studies to be done in the state.

PB81-145211 MF **A01**
Department of Commerce, Washington, DC.
Business America - the Magazine of International Trade. Volume 4, Number 1, January 12, 1981.
Bi-weekly pub.
12 Jan 81, 52p
See also Volume 3, Number 24, PB81-124398.
Paper copy available from Supt. of Docs.

Contents:
- U.S. share of world manufactured exports rises;
- Gulf states adjust to new political realities;
- International marketing highlights;
- Washington trade briefs;
- Foreign industrial production report;
- Economic highlights;
- World trade fair schedule for 1981;
- Worldwide business opportunities.

PB81-145351 PC **A06**/MF **A01**
Arkansas Univ. at Little Rock. Industrial Research and Extension Center.
Arkansas Public Policy Information System: Arkansas Econometric Models.
Research rept.,
Joe H. Jones, William Cheney, and Sarah Breshears. Jul 80, 122p EDA-ERD-81-005
Grants EDA-OER-535-G-77-12, EDA-99-7-13343
See also report dated Jul 79, PB80-154495.

The report on the development of the Arkansas econometric models is part of an overall description of the Arkansas Public Policy Information System (APPIS). APPIS is designed to be a prototype for the development of public policy information systems by other states. APPIS is a set of econometric models and data bases which specify disaggregate private and public sectors in the Arkansas economy. The system is designed to provide quarterly forecasts of state employment by two-digit Standard Industrial Classification, sources of personal income and detailed sources of state revenues. The complete Arkansas model set consists of an employment and income near-term model, which constitutes the major specification, a long-term growth sub-model and a state revenue sub-model. This is a report on the development of these models. The models in this report are implemented in computer software proprietary to Data Resources, Inc.

PB81-145393 PC **A13**/MF **A01**
Lazar Management Group, Inc., Washington, DC.
Economic Adjustment Strategy for the IDA-ORE Area, Idaho.
Final rept.
Dec 80, 276p EDA-80-0205
Grant EDA-07-29-02265
Portions of this document are not fully legible.

The Ida-Ore Regional Planning and Development Association was awarded a Title IX grant in 1979 to prepare an economic adjustment program for a five-county target area in southwestern Idaho. This report briefly describes the problems and potentials of the target area as well as the Hispanic population and presents highlights of the strategy which has been developed. The Target Area suffers from a lack of economic diversification; the job loss and income loss experienced by a community.

PB81-145427 PC **A05**/MF **A01**
Nova Univ., Fort Lauderdale, FL. Graduate Program in Public Administration.
Report on Income Distribution and Poverty in Costa Rica.
General working document no. 2,
Manuel J. Carvajal. Jan 79, 82p AID-PN-AAH-035

This report presents a statistical analysis of income distribution and poverty patterns in Costa Rica. In Costa Rica, almost 60% of the population are rural; women constitute one-fifth of the labor force; and more than a third of the labor force is employed in the agricultural sector. In addition, 42.3% of all households are urban; 35.6% rural non-farm; and 22.1% farm.

PB81-145898 PC **A08**/MF **A01**
ICF, Inc., Washington, DC.
Economic Impact Analysis of Proposed Section 5 Notice Requirements. Appendix: Volume I.
Support document,
Robert Dresser, James Edwards, Joseph Kirk, and Stuart Fribush. Sep 80, 169p EPA-560/12-80-005A
Contract EPA-68-01-5878
See also Volume 2, PB81-145906.

This report presents the analysis of the economic impact of TSCA section 5 rules on the chemical industry. The industry will be impacted when it introduces new chemicals. Of the six distinguishable consequences for the chemical industry, the most important are the nonquantifiable uncertainty consequences. The more unclear EPA's rationale in making section 5 notice decision, the greater are the uncertainties. There will likely be a short-run drop in the number of new chemicals introduced into commerce as chemical companies shift their innovation activities into 'safe' chemicals. Current data do not allow a quantitative estimate to be made of the rate of chemical introductions, or the extent of the reduction caused by the section 5 notice requirements; and, even if the data were available, it is doubtful that accurate quantitative predictions could be made. Smaller companies will face greater uncertainties and the direct costs will more often be a factor in company decisions. In the long run, this regulation may cause the chemical industry to be composed of a fewer number of larger competitors better able to absorb the direct costs and regulatory uncertainty associated with the requirements.

PB81-145906 PC **A15**/MF **A01**
ICF, Inc., Washington, DC.
Economic Impact Analysis of Proposed Section 5 Notice Requirements. Appendix: Volume II.
Support document,
Robert Dresser, James Edwards, Joseph Kirk, and Stuart Fribush. Sep 80, 330p EPA-560/12-80-005B
Contract EPA-68-01-5878
See also Volume 1, PB81-145898.

This report presents the analysis of the economic impact of TSCA section 5 rules on the chemical industry. The industry will be impacted when it introduces new chemicals. Of the six distinguishable

consequences for the chemical industry, the most important are the monquantifiable uncetainty consequences. The most unclear EPA's rationale in making section 5 notice decisions, the greater are the uncertainties. There will likely be a short-run drop in the number of new chemical intrroduced into commerce as chemical companies shift their innovation activities into 'safe' chemicals. Current data do not allow a quantitative estimate to be made of the rate of chemical introductions, or the extent of the reduction caused by the section 5 notice requirements; and, even if the data were available, it is doubtful that accurate quantitative predictions could be made. Smaller companies will face greater uncertainties and the direct costs will more often be a factor in company decisions. In the long run, this regulation may cause the chemical industry to be composed of a fewer number of larger competitors better able to absorb the direct costs and regulatory uncertainty associated with the requirements.

PB81-145997 CP **T03**
Federal Communications Commission, Washington, DC. Data Automation Div.
Industry Equal Employment Opportunity Master File (1978).
Data file,
Charles Johnson. 1978, 1p FCC/DF-81/002
Supersedes Rept. no. FCC/DF-79/011, PB-294 872.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

EEO Master File, (S) are updated annually and maintained as separate entities for each reporting year, with up to five years of data being retained for report purposes. Each file is sequenced by file Number, Call Sign and year contains statistical data submitted by commercial and non-commercial broadcast stations on FCC form 395. The data, which reflects the distribution of employees in designed job categories by race, sex and certain other minority employment data and the fair employment practices of the Broadcast Industry. The 1979 data base currently contains 6901 records of 1956 characters in length, 1 record per block. These records have been converted from HONEYWELL System Standard Format, BCDIC, to EBCDIC, 1600 BPI, 9-Track, odd parity tape. The converted data base contains 6901 records, 1956 characters long, with the last two (2) character positions space filled.

PB81-147167 PC **A05/MF A01**
Morehead State Univ., KY.
The Impact of Federal Regulations on the Small Coal Mine in Appalachia.
Final rept.,
Bernard Davis, and Raymond Ferrell. Nov 80, 91p
Contract SBA-2644-OA-79
Portions of this document are not fully legible.

This report contains the results of a study of the total costs of compliance with Federal regulations of coal mines in Eastern Kentucky. The mines were stratified by tonnage per year and employment. Mail and personal interview surveys were conducted for each stratum. Survey results attempt to suggest the competitive position of small concerns and to form a basis for necessary modifications in regulations.

PB81-147241 PC **A09/MF A01**
Lockwood Greene Engineers, Inc., New York.
Feasibility Study for an Integrated Fish Processing Industry, Southeastern North Carolina.
Apr 79, 192p EDA-81-006
Grant EDA-04-06-01581

In short, the study was to examine the broad implications of a sophisticated seafood processing industry in the vicinity of Carolina Beach. Further, if this proved feasible, the study was to outline a strategy and provide guidelines for developing such an industry. Increasing quantities of high value fisheries resources will be landed in North Carolina as a result of new fishing techniques which are being introduced. Sufficient fishery resources are locally available to support a technologically sophisticated seafood processing industry in the vicinity of Carolina Beach, North Carolina. Also, there is a market for volume items which would be processed by such an industry.

PB81-148363 PC **A08/MF A01**
Office of the United States Trade Representative, Washington, DC.
A Preface to Trade.
1980, 157p

The book is designed to provide a brief overview of the evolution of U.S. international trade policy and of the policymaking process. A special effort has been made to sharpen public awareness and understanding of trade issues, and especially to provide interested individuals and members of the private sector advisory system with an introduction to the executive structure, organization and responsibilities in the development and administration of U.S. trade policy.

PB81-148967 PC **A02/MF A01**
Bureau of Mines, Washington, DC.
The U.S. Copper Mining Industry. A Perspective on Financial Health.
Information circular/1980,
T. T. Tomimatsu. 1980, 20p BUMINES-IC-8836

This Bureau of Mines paper investigates, explores, and analyzes the corporate structure dynamics and financial ratios to evaluate the economic health of the U.S. copper producers. It highlights the corporate policy options and measures of corporate profitability and suggests that a competitive domestic copper industry will exist in the future. The study highlights the activities of 14 selected major copper-producing companies, including their subsidiaries or affiliates, that were responsible for more than 95 percent of the total U.S. production in each of the years since 1969.

PB81-149486 PC **A07/MF A01**
Idaho Univ., Moscow. Water Resources Research Inst.
Legal, Financial, and Economic Analysis of a Water Supply Bank in Idaho.
Research technical completion rept.,
Catherine A. Hofmann, Jerry Wegman, and Faramarz Damanpour. Aug 80, 147p W81-00977, OWRT-B-047-IDA(1)
Contract DI-14-34-0001-9112

Water banking can conceptually facilitate the development of rational market mechanisms for water. Idaho has authorized the establishment of a Water Supply Bank to be operated by the Idaho Water Resources Board. This study analyzes the legal, finacial and economic feasibility of the Water Supply Bank. Water banking will supplement existing water transfers by water management and delivery organizations in providing access to market allocation mechanisms. While water banking can improve and facilitate the operation of market forces in water pricing and allocation, constraints on rational markets still exist. These constraints are prohibition on water transfers where adverse third-party effects are evident and institutional encumbrances which require a fixed price for the rental of storage water.

PB81-802324 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Production Planning and Scheduling. 1978-1980 (Citations from the NTIS Data Base).
Rept. for 1978-80.
Jan 81, 205p
Supersedes PB80-802788, and NTIS/PS-78/1193. See also 1964-December, 1977, PB80-802770.

The bibliography cites research on the planning and scheduling of industrial production. Operations research studies, time studies, and automation studies for the solution to many production problems are included. (This updated bibliography contains 198 citations, 80 of which are new entries to the previous edition.)

5D. History, Law, and Political Science

AD-A094 532/9 PC **A02/MF A01**
Army Field Artillery School, Fort Sill, OK.
Manchuria. A Military Bibliography of Books and Periodicals.
Final rept.,
Lester L. Miller, Jr. 26 Feb 81, 14p Rept no. SB-75

This bibliography concerns the three north eastern provinces of China and warfare which has taken place in the region during this century. Selection of materials is from book and periodical holdings of the Morris Swett Library, USAFAS. (Author)

AD-A094 597/2 PC **A08/MF A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of Events Leading to the Chinese Invasion of Vietnam.
Master's thesis,
Luanne J. Smith. Sep 80, 166p

This thesis focuses on events in Southeast Asia which contributed to the causes of the Chinese invasion of Vietnam in 1979. It is shown that Vietnam was largely responsible for the Vietnam-Cambodia conflict and for the internal political chaos within Cambodia after 1975; that local hostilities in the Indochinese peninsula were intimately related to worldwide communist/anti-communist struggles and to the Sino-Soviet dispute; and that the Chinese invasion of vietnam was largely in response to the earlier Vietnamese invasion of Cambodia. (Author)

PB81-144099 PC **A04/MF A01**
General Accounting Office, Washington, DC. International Div.
Cooperation in Agricultural Assistance: An Elusive Goal in Indonesia.
Report to the Congress.
11 Jun 80, 63p ID-80-29

From 1970 to 1978, 17 members of the donor assistance consortium for Indonesia have provided the Indonesian Government with about $10 billion in overall assistance. An additional $1.9 billion was provided in 1979. Much of this assistance has been aimed at reducing the country's critical rice import dependency by developing long-term food production. The need for donor cooperation in the development process is widely acknowledged, but achieving a cooperative donor effort focused on basic, priority needs has proved elusive in Indonesia. To alleviate Indonesia's food problems, GAO recommends that U.S. assistance--through both bilateral and multilateral programs--be made more cohesive.

PB81-856056 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Public Lands: Energy and Environmental Aspects. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Dec 80, 160p NERACUSGNT2664
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning energy and environmental considerations in the management, development, and use (existing and proposed) of national and state public lands. Studies, analyses, and evaluations of a variety of environmental and energy issues and concerns, and geographic locations are included. (Contains 154 citations, fully indexed and including a table of contents.)

PB81-856064 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Public Lands: Energy and Environmental Aspects. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 111p NERACEDBNT2664
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning energy and environmental consider-

ations in the management, development, and use (existing and proposed) of national and state public lands. Studies, analyses, and evaluations of a variety of environmental and energy issues and concerns, and geographic locations are included. (Contains 98 citations, fully indexed and including a table of contents.)

PB81-856841 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cuba. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Jan 81, 90p NERACUSGNT2207
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the political, social, economic, and technological aspects of Cuba, chiefly from the perspective of the United States. (Contains 81 citations, fully indexed and including a table of contents.)

5E. Human Factors Engineering

AD-A094 215/1 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Physiological and Psychological Factors in Aircraft Operations - An Overview,
Henning E. Von Gierke. 1976, 16p Rept no. AFAMRL-TR-76-46
Presented at the Flight Mechanics Panel Symposium, Sandfjord (Norway), 31 May-3 Jun 76.

The emphasis of aeromedical research has shifted over the past 10 years. The traditional mission of defining human tolerance to environmental factors and protecting the aircrew against them has been solved to some degree even if further refinement of tolerance limits, their quantitative understanding, and the simultaneous and consecutive interaction of the various stressors deserve further efforts. However, the center of activity has shifted to the performance aspects of the flight environment and to the prediction of aircrew effectiveness, mission success, and survivability from the complex interaction of environmental, physiological and psychological factors. To an increasing degree basic research studies on the physiological effects of specific environments such as acceleration, heat, vibration and noise were supplemented as realistically as possible by mission simulations, and by attempts to assess and quantitate aircrew and/or overall weapon systems effectiveness. This trend in laboratory and simulation research clearly enabled a more realistic and quantitative analysis and optimization in the development of new systems.

AD-A094 287/0 PC **A06**/MF **A01**
Boeing Aerospace Co., Seattle, WA. Engineering Technology Div.
User's Guide for the Design Sections of MIL-H-46855.
Final rept. 27 Sep 79-26 Sep 80,
Mildred English. 26 Sep 80, 106p D180-26112-1, NADC-79220-60
Contract N62269-79-R-0740
See also AD-A092 009.

This report explains how to implement the design sections of MIL-H-46855, Human Engineering Requirements for Military Systems, Equipment and Facilities. Written for Navy and contractor Human Factors Engineering (HFE) specialists. Cites DoD and Navy requirements for performing HFE design during system acquisition. Describes 8 standard HFE design techniques and 9 design techniques using computers. Explains when and how techniques are used, their products and purpose, and advantages and limitations. (Author)

AD-A094 323/3 PC **A02**/MF **A01**
Air Force Aerospace Medical Research Lab., Wright-Patterson AFB, OH.
Evaluation of AFIT/F-16 Restraint Concepts in the + or - 2Gy Environment.
Technical rept.,
Robert E. Van Patten, John W. Frazier, Daniel W. Repperger, and Dana B. Rodgers. Oct 80, 24p Rept no. AFAMRL-TR-80-130

The acceleration stresses imposed by the lateral (+ or - Gy) maneuvering capabilities of six-degrees-of-freedom (6DOF) aircraft, such as the AFTI/F-16, may potentially impact pilot performance. This centrifuge research was done to evaluate the effectiveness of special canopy-rail-mounted shoulder restraints at + or - Gy in the presence of a sum-of-sines tracking task implemented via a side stick (force) controller. Results indicate that additional restraints are desirable. (Author)

PAT-APPL-6-193 048 PC **A04**/MF **A01**
Department of the Air Force, Washington, DC.
Method and Apparatus for Measuring Hand-eye Coordination While Tracking a Changing Size Image.
Patent Application,
David M. Regan. Filed 2 Oct 80, 51p AD-D008 047/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Hand-eye coordination while tracking a changing size image is measured by a method that includes: displaying an image that is varied in size in response to a programmed signal; having the person under test manipulate a manual control that effects image size change by cancelling the effects of the programmed signal; and, comparing the tracking response with the image size change, the difference therebetween being a measure of the subjects' hand-eye coordination. The image can be randomly displaced laterally during test and its light intensity parameters can be varied. Image size change is programmed in various ways including randomly occurring reversals in direction of change. The method is implemented by means of an image figure generator that provides a rectangular image on the screen of a CRT. A programmable image size change circuit controls the size of the rectangle in concert with a potentiometer circuit that is manually controlled by the test subject. Other electronic circuits provide for lateral displacement of the image, image/screen intensity changes and the processing and display of tracking errors. (Author)

5F. Humanities

AD-A094 081/7 PC **A04**/MF **A01**
Military Academy, West Point, NY.
The Proceedings of the War and Morality Symposium held at United States Military Academy, West Point, New York on 1-2 May 1980,
Roger A. Rains, and Michael J. McRee. 1980, 57p

There are two major questions about the morality of nuclear warfare. One is: Under what conditions is it morally acceptable to become involved in military combat of such seriousness that the use of nuclear weapons might be considered. If the answer to this question were, 'Never,' then the second question need not arise. But, I believe it would be agreed that there are circumstances in which it is permissible to become involved in such a war; the circumstances of World War II are an example. Such conditions exist if there is a clear threat to a decent, civilized way of life for a large number of people. So, the second question is: If a nation is involved in a serious war, under what conditions is it permissible morally for it to employ nuclear weapons. It is the second question which I propose to address. Actually, I shall address only part of this second question: I shall concern myself only with the employment of tactical nuclear weapons. I mean by a 'tactical' nuclear weapon one of comparatively low yield (e.g., one kiloton), capable of being accurately directed at targets a short distance away (e.g., by an artillery shell), and used for combat purposes only, not one employed to strike at targets of more long-range significance, such as factories: and I shall assume only defensive employment is contemplated. I wish to inquire when such weapons are morally permissible.

PB81-802753 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Archaeology: Site Studies, Activation Analysis, Preservation, and Remote Sensing. 1978-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1978-Nov 79.
Jan 81, 243p

This bibliography contains general studies as well as chemical analysis of archaeological specimens. The chemical analysis is mainly activation analysis of articles such as metals, pottery, coins, paintings, soils, glass and paper from Medieval, Grecian, Egyptian, Mayan, and prehistoric times. The general studies include results of excavation from the United States. Also covered is work on preservation of artifacts and remote sensing for the site location. (This updated bibliography contains 237 citations, none of which are new entries to the previous edition.)

PB81-802761 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Archaeology: Site Studies, Activation Analysis, Preservation, and Remote Sensing. December, 1979-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 79-Dec 80.
Jan 81, 139p
Supersedes PB80-802176, and NTIS/PS-78/1242. See also 1964-1976, NTIS/PS-78/1241 and 1977, PB80-802168.

These citations of federally-funded research contains the chemical analysis of archaeological specimens, as well as general studies. The chemical analysis deals primarily with activation analysis. Articles examined include metals, pottery, coins, paintings, soils, glass, and paper from Medieval, Grecian, Egyptian, Mayan, and prehistoric times. The general studies cites other archaeological research, including results of excavation from the United States. Also covered is work on preservation of artifacts and remote sensing for the site location. (This updated bibliography contains 133 citations, all of which are new entries to the previous edition.)

5H. Man-Machine Relations

AD-A094 227/6 PC **A07**/MF **A01**
Bunker-Ramo Corp., Westlake Village, CA. Electronic Systems Div.
Evaluation of Factors Unique to Multifunction Controls/Displays Devices.
Final rept. 1 Mar-30 Nov 77,
Gloria L. Calhoun, Emmett L. Herron, John M. Reising, and Robert P. Bateman. Nov 80, 134p AFWAL-TR-80-3131
Contract F33615-78-C-3614

Aircraft which utilize computers will require the use of multifunction displays and keyboards (MFK). Eight arrangements of formats which present flight control, navigation, and status information were examined. All were found useable but arrangements in which attitude information was placed above navigation information and those utilizing electro-optical devices rather than conventional flight instruments were slightly better. Two types of MFK logic were also examined. MFK operation was more efficient with Tailored Logic (frequently used functions presented) than with Branching Logic (functions presented by systems). (Author)

AD-A094 314/2 PC **A03**/MF **A01**
Illinois Univ. at Urbana-Champaign. Engineering-Psychology Lab.
The Application of Additive Factors Methodology to Workload Assessment in a Dynamic System Monitoring Task.
Interim technical rept.,
John Micalizzi, and Christopher D. Wickens. Dec 80, 50p Rept no. EPL-80-2/ONR-80-2
Contract N00014-79-C-0658

This report describes the theory that lies behind applications of Sternberg's additive factors meth-

odology to the selective assessment of primary task workload, within the framework of a multiple resources model of human information processing. In applying this methodology, a reaction time task is performed alone and concurrently with a primary task of interest. Orthogonally, a characteristic of the RT task is varied to prolong one stage of processing. If the effect of this manipulation is greater in the presence of the primary task, than in its absence (i.e., an interaction), then the resource demands of the primary task are assumed to overlap with those imposed by the RT manipulation. If there is no interaction (additivity), then different resources are required. Conclusions of previous research efforts that have employed additive factors in dual task paradigms are summarized. A validation experiment is then reported in which a failure detection/monitoring task is employed as a primary task. Manipulations of perceptual and response load of a secondary reaction time task are performed, while subjects engage in a primary task of monitoring for, and detecting failures of an autopilot-controlled dynamic system. This primary task is assumed to place heavy demands on the earlier stages of processing.

AD-A094 353/0 PC **A14/MF A01**
Analytics, Inc., Willow Grove, PA.
The Human Operator Simulator. Volume IX. HOS Study Guide.
Technical rept.,
Melvin I. Strieb, Floyd A. Glenn, and Robert J. Wherry, Jr. Sep 78, 310p Rept no. TR-1320-VOL-9
Contract N62269-78-M-6684

In recent years, as 'systems' (whether spacecraft, jet fighters, or office equipment) have become more complex, there has been a growing concern about the extent to which these systems are adapted to the capabilities of the individuals who are called on to operate them. The methodology currently used to evaluate systems--building prototypes or testing designs in simulators--relies on the construction of real hardware that can be tested with real operators. This requirement inevitably means that there is a substantial time lag between the system's initial design and the time when the prototype can be built, tested, evaluated, and any proposed changes 'recycled' through the system design process. In addition, the use of dynamic simulators that use real operators inevitably requires a substantial outlay of money for the development of attendant hardware and software, for the training and retraining of operators. and for the performance, analysis, and evaluation of controlled experiments that utilize the simulators. The Human Operator Simulator (HOS) was developed to alleviate these problems in two ways. First, by enabling potential problem areas to be identified earlier in the system design process, HOS enables corrections to be made at lower cost and with less disruption of development schedules. Second, for areas of marginal operator performance, HOS can focus dynamic simulations on the likely sources of difficulty, reducing the time and cost required to validate system operability.

AD-A094 482/7 PC **A10/MF A01**
Perceptronics, Inc., Woodland Hills, CA.
Man-Machine Communication in Remote Manipulation: Task-Oriented Supervisory Command Language (TOSC).
Final technical rept. 2 Feb 79-1 Feb 80,
Yee-Yeen Chu, William H. Crooks, and Amos Freedy. Mar 80, 225p Rept no. PFTR-1034-80-3
Contract N00014-76-C-0603

This report covers research and development directed toward the investigation and optimization of man-machine communication in computer-aided remote manipulation. The purpose of this program was to determine through analytical and experimental studies the relationships between primary man-machine communication factors and system performance, and to develop and demonstrate a communication design methodology to improve operator performance with remotely controlled systems. Specific objectives included the following: (1) to perform an analysis of communications requirements in computer-aided manipulation and closely related areas of adaptive and autonomous control, (2) to establish an experimental system for study of task-oriented supervisory control of a remote manipulator, (3) to implement and evaluate communication systems, encompassing both language and interface, designed to permit natural and efficient control of a variety of remote manipulation tasks, (4) to identify the primary factors influencing the success of shared man-computer control, and to establish quantitative relationships between these factors and the system performance measures, and (5) to provide guidelines for the design of man-computer communication in subsequent autonomous, adaptive and remotely-manned systems.

5I. Personnel Selection, Training, and Evaluation

AD-A094 050/2 PC **A05/MF A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Air Traffic Control and Combat Control Team Operations, AFS 272X0/D.
Occupational survey rept.
Dec 80, 94p

This report presents the results of a detailed Air Force Occupational Survey of the Air Traffic Control (AFS 272X0) career ladder and the Combat Control Team (AFS 272X0D) shred. The overall job structure of these two ladders was found to be diverse, with 10 major job groups being identified. Jobs identified varied primarily on the basis of specialization in the areas of Control Tower, Radar, Supervisory, Perimeter Acquisition Radar, Combat Control Team, Mobile, Terminal Instrument Procedures, Analysis, or Instructor functions. In addition, several job types and/or subjob types were identified within the Radar, Control Tower, and Combat Control Team functional areas. The Air Traffic Control career ladder was divided into two main functional areas, Control Tower and Radar Air Traffic Control. Combat Control Team personnel perform few tasks in common with either of the major 272X0 Control Tower or Radar Air Traffic Control functional areas. In view of the specialization which was found to exist, it would appear that: (1) some form of channelized training for 272X0 personnel would be more cost effective; and (2) the creation of a separate AFSC for 272X0D personnel should be given serious consideration.

AD-A094 173/2 PC **A05/MF A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Open Mess Management Career Ladder AFS 742X0 and CEM Code 74200.
Occupational survey rept.
Dec 80, 84p

Thirteen job groups and independent job types were identified in the career ladder structure, eleven of which were directly involved with the performance of day-to-day operations of open mess facilities or activities. The remaining two independent job types were comprised of personnel performing command level staff inspection and administrative functions. Although there were a number of job types identified, which seems to indicate a number of specialized jobs, the specialization was a matter of degree. There was, in fact, a significant amount of task overlap across a number of the groups, thus indicating a career ladder that is very homogeneous in nature.

AD-A094 174/0 PC **A07/MF A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Aircraft Maintenance and Munitions Officer Utilization Field AFSCs, 4011, 4016, 4021, 4024, 4051A, 4054A, 4051B, 4054B, and 4096.
Occupational survey rept.
Dec 80, 126p

This report describes an occupational survey of the Aircraft Maintenance and Munitions utilization field, AFSs 401X, 402X, 405XA, 405XB and 409X. The purpose of the occupational survey was to assess the jobs and tasks performed by Aircraft Maintenance and Munitions officers and to provide an objective description of the personnel resource which will aid in a variety of management decisions affecting such areas as recruiting, classification, training and career planning. Specifically, this report describes the methods used to collect occupational data from the Aircraft Maintenance and Munitions officer population and the analysis of the occupational data.

AD-A094 176/5 PC **A04/MF A01**
System Development Corp., Santa Monica, CA.
Organizational Effectiveness Case Development Manual.
Research product rept.,
James Bedoian, Larry E. Greiner, Charles P. Schaefer, Warren H. Schmidt, and Stanley R. Weingart. Oct 80, 70p SDC-TM/6045/001/00, ARI-RP-80-26
Contract DAHC19-78-C-0008

The manual is a guide for developing Organizational Effectiveness (OE) case studies. Two points are stressed: the techniques of obtaining and recording data, and the writing of the case in the most efficient and effective way. The manual is divided into three main sections: (1) on the issues of client system sanction, confidentiality, and anonymity; (2) on the problems of gathering, recording, and cataloging case data; and (3) guidelines for writing a primary Documentation Case and additional Teaching Cases. (Author)

AD-A094 199/7 PC **A03/MF A01**
Deputy Chief of Naval Operations (Manpower, Personnel and Training), Washington, DC.
U.S. Navy Yearbook of Manpower, Personnel & Training, Research, Development and Study Activities. Volume 1. Number 1,
H. Wallace Sinaiko, Kneale T. Marshall, Patricia J. Thomas, A. Michael Spooner, and Walter S. Chambers. Jun 80, 34p

Contents: How Are We Going to Keep Them From Going Back to the Farm; Research on Personnel Loss in the Navy; Issues in the Management of Women in the Navy; Visual Simulation for the Navy.

AD-A094 279/7 PC **A03/MF A01**
Human Resources Research Organization, Alexandria, VA.
A Model for Matching Training Approaches with Training Settings.
Interim rept.,
Edgar M. Haverland. Mar 74, 48p Rept no. HUMRRO-IR-D7-74-147
Contract F44620-74-C-0007

This Interim Report describes a preliminary model for evaluating specific training approaches and/or innovations in relation to specific training settings. The evaluation is accomplished by systematically comparing the characteristics of the approach/innovation with the corresponding characteristics or requirements of the setting. The function of the model is to aid in eliciting and arranging information so that all relevant information is obtained and arrayed in a way that facilitates decision-making. (Author)

AD-A094 283/9 PC **A03/MF A01**
Oregon Univ., Eugene. Graduate School of Management and Business.
Commitment, Careers, and Retention in Organizations.
Final rept. 1 Oct 75-1 Oct 80,
Richard M. Steers, Richard T. Mowday, and Lyman W. Porter. Nov 80, 29p Rept no. TR-23
Contract N00014-76-C-0164

The major purpose of the project was to carry out research designed to examine the complex interrelationships which exist among employee career patterns, commitment and attachment to organizations, and subsequent employee turnover and absenteeism. The major thrust of the project has been to develop empirically based theoretical models of employee attachment processes. This thrust can be seen in several major areas.

AD-A094 317/5 PC **A08/MF A01**
Advanced Research Resources Organization, Washington, DC.
Perceptual-Motor and Cognitive Performance Task-Battery for Pilot Selection.
Final rept.,
David L. Imhoff, and Jerrold M. Levine. Jan 81, 160p AFHRL-TR-80-27

Contract F33615-79-C-0004

A review of the literature on pilot selection and training, perceptual-motor processes, and cognitive processes was conducted. The objectives of this review were: (a) to identify perceptual-motor and cognitive tasks that demonstrated reliable individual differences in performance and (b) to identify perceptual-motor abilities and cognitive processes of demonstrated importance to successful piloting behavior. From this review, a set of tasks were identified that tapped the abilities and processes important to piloting and that showed evidence of producing reliable individual differences in performance. A conceptual framework makes explicit the link between the tasks selected and the requirements for successful pilot performance. This resulted in a large number of tasks which were candidates for inclusion in a pilot selection task battery. Psychometric and pragmatic criteria were applied to the tasks in the candidate pool, resulting in the identification of 15 tasks for inclusion in the final task battery. These tasks span the perceptual-motor and cognitive domains, with special emphasis on attentional and decision-making performance. The paradigms for the selected tasks are specified in detail to allow for the development and implementation of the tasks on a computer system, and a number of implications for validation of the battery are provided. (Author)

AD-A094 318/3 PC **A04**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Fabrication and Parachute Career Ladder, AFS 427X3.
Occupational survey rept.
Dec 80, 66p

In April 1977, the Parachute Rigger career ladder (AFSC 582X1) was merged with the Fabric and Rubber Products career ladder (AFSC 582X0). The merger of these two ladders resulted in a new AFSC, 427X3, titled Fabrication and Parachute. The current project was requested by TTGXM, Chanute AFB, Illinois, in order to measure the impact of merging the two ladders. In the past, the parachute shop and the fabric shop were often located close4 to each other, and often shared work. They are now under a single shop organization with sections defining mush the same separation of work as before, particularly in the larger shops. The current survey will reflect the results of the merger. Topics discussed in this report include: (1) survey methodology; (2) job structure within the ladder; (3) an analysis of skill level groups; and (4) a comparison of the results of the current survey with previous surveys.

AD-A094 380/3 PC **A03**/MF **A01**
Applied Science Associates, Inc., Pittsburgh, PA.
Job Performance Appraisal System Training Program.
Final rept.,
Zita Glasgow, Mary Lou Simkins, and John A. Guerrieri. Jan 81, 34p AFHRL-TR-80-56
Contract F33615-79-C-0011

The Civil Service Reform Act of 1978 requires each government agency to develop a performance-based employee appraisal system. The purpose of this study was to determine how to effectively train more than 200,000 Air Force civilian employees to use the Job Performance Appraisal System (JPSA) designed by the Air Force. Experimental comparisons were made of the differing versions of two basic instructional prototypes: instructor-led and self-instructional. Results demonstrate that each approach teaches all occupational levels equally well, provided the instructor-based training is led by someone who is very knowledgeable in the system. However, students respond significantly more positively to instructor-led training than self-instructional training. (Author)

AD-A094 381/1 PC **A03**/MF **A01**
Canyon Research Group, Inc., Westlake Village, CA.
Simulator Training Requirements and Effectiveness Study (STRES): Executive Summary.
Final rept.,
Clarence A. Semple. Jan 81, 49p AFHRL-TR-80-63
Contract F33615-77-C-0067

Seven technical reports have been prepared to date for the Simulator Training Requirements and Effectiveness Study (STRES). One is this Executive Summary, which is designed to serve two purposes. One purpose is to summarize the content of the other six reports, which address the following aircrew training device (ATD) issues: ATD fidelity; instructional support features; utilization of ATDs in aircrew training programs; ATD life cycle costs; and worth of ownership. Program objectives in each area are set forth, together with summaries of technical report content dealing with each objective. Additional topics addressed are plans for future research and the abstract bibliography that was prepared as part of the program. The second purpose of the Executive Summary report is to present a master index to other program technical reports so that readers have a unified source for identifying detailed information bearing on training device information covered in other program technical reports. (Author)

AD-A094 436/3 PC **A07**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
The Battalion Commander's Guide to Successful Training Management.
Master's thesis,
Gary S. Willison. 6 Jun 80, 130p AD-E750 058

This Study attempts to determine if a desk side training management job aid would be a useful tool for battalion commanders for the management of individual and unit training. The investigation is focused on training gaps which exist at battalion level. Investigation reveals that a distinct need for a training management job aid does exist which ties together key aspects of the training management system. Based on the training gaps identified in the thesis, this job aid was developed and is contained as an appendix to this thesis. (author)

AD-A094 452/0 PC **A02**/MF **A01**
Military Academy, West Point, NY. Office of the Director of Institutional Research.
Characteristics of the Class of 1984,
John W. Houston. Dec 80, 19p Rept no. 81-004

This report presents the biographical characteristics and achievements of the 1,457 new cadets and nine-reentered or turned back cadets who entered the United States Military Academy in the Class of 1984 (Author)

AD-A094 453/8 PC **A02**/MF **A01**
Training Analysis and Evaluation Group (Navy), Orlando, FL.
Numerical Skills of Navy Students: An Evaluation of a Skill Development Workbook.
Technical note,
Harry L. Bowman, Norman J. Kerr, and William C. McDaniel. Dec 80, 15p Rept no. TAEG-TN-8-80
Presented at the Annual Meeting of the Mid-South Educational Research Association, New Orleans, 14 Nov 80.

In recent years, basic skills training for enlisted Navy personnel has become an increasing necessity. Reading, verbal language, and mathematics instruction have been addressed in various programs designed for recruits, general detail sailors, and technical training qualified personnel. The current emphasis on basic skills training is expected to continue into the foreseeable future. The purpose of this paper is to report on a field test of the numerical skills workbook that was conducted with enlisted Navy personnel at the Recruit Training Command in Orlando, Florida. Information will be provided on the subjects, data sources, implementation procedures, and results. Background information will be presented in a description of the developmental activities.

AD-A094 455/3 PC **A04**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Recollections of a Dental Researcher. Fifty Years at the U.S. National Bureau of Standards: Interviews with George C. Paffenbarger, DDS,
William R. Forrest, and Arden G. Christen. Oct 80, 53p Rept nos. SAM-REVIEW-1-80, SAM-TR-80-20

This is the life of Dr. George C. Paffenbarger, DDS, as told in detail to the interviewers. Dr. Paffenbarger, a world-renowned researcher in dental materials at the National Bureau of Standards, Washington, D.C. (1929-1980), is a noted researcher and author of over 170 publications, developer of specifications for the American Dental Association, lecturer, and teacher. His contributions have revolutionized the concepts, ideas, and practices of dental materials in the military and civilian sectors. (Author)

AD-A094 479/3 PC **A03**/MF **A01**
Houston Univ., TX.
Evaluation of a New Method for Assessing Change to Planned Job Redesign as Applied to Hackman and Oldham's Job Characteristic Model.
Technical rept.,
James R. Terborg, and Gregory A. Davis. Dec 80, 48p Rept no. TR-80-6
Contract N00014-78-C-0756
Prepared in cooperation with Oregon Univ., Eugene. Graduate School of Management.

Pre and Post ratings of job characteristics collected in studies of planned job redesign may provide inaccurate assessment of perceived change if the intervention alters the frame of reference used by the incumbent to anchor responses. Based on Howard's work with response shifts (Howard et al, 1979), an experimental simulation was conducted that included Pre, Post and Retrospective Then ratings. Forty eight subjects worked at enriched and unenriched versions of a work-study job. Although a response shift was not found, retrospective ratings were found to be internally valid and using a within subjects design, support for the Hackman-Oldham model was observed. Future use of retrospective ratings is discussed. (Author)

AD-A094 498/3 PC **A03**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Fatigue and Workload in Four-Man C-5A Cockpit Crews (Volant Galaxy).
Final rept. 1 Oct 79-1 Feb 80,
William F. Storm, and John T. Merrifield. Aug 80, 46p Rept no. SAM-TR-80-23

Triple Inertial Navigation Systems (INS) are being installed on C-5A aircraft. At the request of the USAF Airlift Center, aircrew fatigue and workload were evaluated in 4-man C-5A cockpit crews (aircraft commander, copilot, and 2 flight engineers) performing typical long-range transport missions on triple-INS-equipped aircraft. Most of the navigator's duties were assumed by the pilots with the balance assigned to the flight engineer station. Considering subjective fatigue and workload findings, discussions with crewmen, the workloads reported during emergencies and aerial refuelings, and the operational requirements of wartime conditions, it was recommended that the 4-man C-5A crew concept not be implemented at this time. (Author)

AD-A094 499/1 PC **A08**/MF **A01**
Air Force Occupational Measurement Center, Randolph AFB, TX.
Telecommunications Systems Career Ladder, AFSC 307XO.
Occupational survey rept.
Jan 81, 175p

Inventory booklets were administered to Telecommunications Systems Control (AFSC 307XO) personnel worldwide. Survey results are based on the responses from 1,289 AFS 307XO incumbents (86 percent of assigned). A majority of the incumbents surveyed were assigned to AFCC. DAFSC 307XO personnel were found to be performing a wide variety of jobs. These jobs can be loosely grouped together into two functional areas: (1) Circuit Monitoring and Analysis and (2) Supervision, Training, and Administration. Personnel in the Circuit Monitoring and Analysis functional area make up approximately 69 percent of the total sample. Navigational Aids Communication Management Office (NCMO) Personnel and Circuit Analysis NCOs, perform a narrow job and have very low job satisfaction indicators. Technical telecommunications tasks, such as performing circuit monitoring and analysis and maintaining telecommunications services, are indicative of 30730/50 personnel. Seven-skill level personnel are supervisors-technicians, spending approximately half of their job time on technical telecommunications tasks, and the

remainder on supervisory tasks. DAFSC 30790 and CEM Code 30700 personnel are the supervisors and managers of the career ladder. These incumbents tasks, and spend very little time performing technical telecommunications tasks.

AD-A094 530/3 PC **A03**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Training Effectiveness of Visual and Motion Simulation.
Interim rept. Jul 78-Sep 78,
Wayne L. Waag. Jan 81, 28p Rept no. AFHRL-TR-79-72

A review of the literature concerning the training effectiveness of visual and motion simulation is presented in this report. Although there exist much pilot opinion and in-simulator performance data their extrapolation to training effectiveness information is questioned. The present review focuses on data obtained through the application of the transfer-of-training methodology. The results are discussed in terms of study design factors, and recommendations are made wherein additional research data are needed. (Author)

AD-A094 553/5 PC **A15**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Combined Arms Training Program Cost Analysis.
Master's thesis,
Charles D. Lea, and Billy J. Clarkson. Dec 80, 327p

The Marine Corps Air Ground Combat Center is tasked with the mission of developing, administering, and evaluating the Marine Corps Combined Arms Training Program. The allocation of increasingly scarce resources mandates that this training program be conducted as efficiently as possible. The purpose of this thesis is three fold. First, it examines the problems with the present budgeting system, cost accounting and reporting procedures, and the methods of establishing levels of resources to be used in combined arms training exercises employed by the Marine Corps Air Ground Combat Center. Second, it presents a model for accurately estimating the cost of these exercises through the establishement of standard costs. Third, it presents an alternative budgeting and cost reporting system and makes specific recommendations to improve the efficiency of the Combined Arms Training Program.

AD-A094 571/7 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Response Evaluation Approach: An Aid for Computer Assisted Instruction Lesson Writing.
Master's thesis,
Fred D. Soetekouw. Sep 80, 156p

This study develops a computer assisted instruction response evaluation technique to aid CAI lesson writers in course development. The objectives for this technique was to experimentally identify principal incorrect response forms and determine characteristic error patterns for a given concept to be taught. Using a specific concept, the proposed technique was evaluated. Sixty-one subjects were randomly selected from three different universities and assigned to solve a problem-solving task. Using mental imagery and oral reporting, they produced the necessary protocol for this experiment. Although the response evaluation technique developed in this study was reasonably successful, a specific response error pattern for each subject could not be determined. (Author)

AD-A094 608/7 PC **A10**/MF **A01**
Air Force Human Resources Lab., Brooks AFB, TX.
Advanced Flight Simulator: Utilization in A-10 Conversion and Air-to-Surface Attack Training.
Final rept.,
Thomas H. Gray, Edward K. Chun, Harold D. Warner, and James L. Eubanks. Jan 81, 201p Rept no. AFHRL-TR-80-20

The purposes of this research were to develop transition and surface attack simulator training programs for novice A-10 pilots and to determine simulator features and capabilities required for effective training in the air-to-surface (A/S) mission. These goals were refined to four specific objectives: development of a transition and surface attack syllabus; generation of objective performance measurement algorithms; determination of design requirements for instructor stations; and assessment of the utility of advanced instructional features. These objectives were accomplished using A-10 Instructor Pilots and four classes of 'B' course students who had recently completed Undergraduate Pilot Training and Fighter Lead-In-School. Each class received two blocks of instruction on the Advanced Simulator for Pilot Training (ASPT). The first block consisted of 4 to 8 hours of conversion training with primary emphasis on traffic pattern work. The second block of training was composed of 4 to 7 hours of A/S weapons delivery (i.e., dive bombing and strafe). The key findings were: (1) For the initial phases of weapons delivery training, the transfer of training from the ASPT to the A-10 is nearly 100 percent, therefore, in the early phases of A/S training, one simulator mission can effectively replace one aircraft mission, thus allowing actual flying time to be transferred to other phases of training; (2) Objective assessments of piloting and weapons delivery skills are highly useful in A-10 training; (3) Improvements are needed in the display and controls at the A-10 instructor station. (Author)

AD-A094 612/9 PC **A03**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Estimates of the Officer Force Structure Required to Man the Projected Naval Combatant Forces of the 1980s and 1990s.
Technical rept.,
E. V. Alden. Oct 80, 40p Rept no. NPS55-80-015

The Navy policy maker is faced with a great deal of uncertainty when he attempts to formulate manpower plans for the Navy's future officer force structure. Many of these factors are beyond his control; however, there are a few critical factors over which he may exert considerable influence. It is the identification of some of these factors and their impact upon the combatant forces of the Navy of tomorrow and thus the required officer force structure with which this thinkpiece is concerned. (Author)

AD-A950 145/3 PC **A12**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
The HumRRO Training Analysis Directory. Book II, Training Data. Part 1, MOS 101-MOS 357.
Research product rept.,
Francis E. Jones. Aug 58, 266p
Contract DA-49-106-qm-1
See also Book 2, Part 2, AD-A950 146.

No abstract available.

AD-A950 146/1 PC **A11**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
The HumRRO Training Analysis Directory. Book II, Training Data. Part 2, MOS 401-MOS 075.
Research product rept.,
Francis E. Jones. Apr 59, 240p
Contract DA-49-106-qm-1
See also Book 2, Part 1, AD-A950 145.

No abstract available.

HEDL-SA-1975 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
FFTF Operator Training.
27 Sep 79, 7p
Contract AC14-76FF02170

The qualifications required and the training received by FFTF operators are described. The training includes sodium fill training and cold plant qualification. Requirements for supervisors are also outlined. Arrangement of personnel at FFTF is described. Requalification training and recertification are considered. (ERA citation 06:003693)

HRP-0902637/8 PC **A02**/MF **A01**
Puerto Rico Univ., San Juan.
Puerto Rico Experimental Model Dental Auxiliary Training Program. Executive Summary.
Final rept. 22 Oct 76-24 Feb 80,
Iris R. Perez. 30 Jun 80, 22p
Contract PHS-HRA-231-76-0079

There is a felt need in Puerto Rico for providing the dental profession, both in government service as in private dental practice, with well-trained, competent dental auxiliaries at various training levels in the shortest time possible. Originally, the dental auxiliary program of the University of Puerto Rico consisted of two separate programs; a nine month dental assisting program with expanded functions, and an eighteen month dental hygiene program. Program evaluation during this period and evaluation of the prevailing dental care and dental auxiliary manpower needs in the Island, for both public and private dental practitioners, brought about the need to continue exploring new ways of providing training for dental auxiliaries to better serve the manpower needed by the dental profession.

PAT-APPL-6-208 757 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Recoil Force and Weight Loss Simulation Device.
Patent Application,
Paul D. Grimmer. Filed 20 Nov 80, 18p AD-D008 004/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A recoil force and weight loss simulator is disclosed which generates various predetermined forces that may be imparted to training weapons, and other devices so as to give them realistic operational characteristics which they otherwise would not have. The recoil force and weight loss simulator includes first force generating means adapted to move a weapons support stand and, thus, an imitation weapon effectively mounted on the weapons support stand in a rearward direction when activated, and second force generating means adapted to release a weight, when activated, from a predetermined position above a terrain surface such that the weight will fall freely to the terrain surface. Actuating activates the first and second force generating means whenever a marksman triggers the trigger mechanism of the imitation weapon such that the marksman will experience a recoil force and weight loss upon firing the weapon. (Author)

PB81-134991 PC **A07**/MF **A01**
ICF, Inc., Washington, DC.
An Analysis of the Potential Impacts of National Health Insurance Programs on Collective Bargaining.
Final rept.
Aug 80, 136p LABPB-80-9
Contract DL-J-9-P-8-0188

The study explores the possible impact of national health insurance on employers and employees covered by collectively bargained health benefit plans. It analyzes what the impact of associated costs of improved coverage, and cost impacts at the national level would be upon industry and workers and in turn upon the process of collective bargaining. The study identifies how national health insurance will alter past trends in collective bargaining and identifies areas where major adverse impacts might occur.

PB81-135063 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Readability of Road Safety Publications,
D. Sheppard, and C. Harrison. c1980, 12p TRRL-LR-944
Also pub. as ISSN-0305-1293.

Standard tests of 'readability' were applied to several road safety texts. One was found to be 'fairly difficult to read', although there were considerable variations in scores between texts. One text was re-written applying principles known to affect readability and comprehension. Standardized tests indicated that this did improve comprehension quite markedly and specially-designed multi-choice tests also showed that those who had read the re-written text had more knowledge of the topic that was covered than those who had read th original version. Suggestions are made as to how texts on road safety might be written more effectively. (Copyright (c) Crown Copyright 1980.)

PB81-144164 PC **A10**/MF **A01**
San Jose State Univ., CA.
From Visions to Development: A Learning Resource Center-Based Community Education Systems Model.
Interim rept.
Jul 78, 208p AID-PN-AAH-017
Grant AID/1A-G-1169

The San Jose University School of Education was contracted to produce a written conceptual model of a comprehensive and integrated community education system for rural Latin America, reflecting both the needs and realities of nonformal education and integrating these needs as closely as possible with new organizational structures of learning. This document is the first major report on this Learning Resource Center-Based Community Educaton Systems (LRC-BCES) model.

PB81-144354 PC **A04**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
First-Year Activities of the Merit Systems Protection Board and the Office of the Special Counsel.
Report to the Congress.
9 Jun 80, 74p FPCD-80-46

The Merit Systems Protection Board and the Special Counsel were established to safeguard merit systems from political and other abuses and to protect the rights of Federal employees. Transition and startup problems--funding, staffing, and office space prevented the Board and the Special Counsel from establishing full operations during 1979, but they made good progress in establishing the capability to carry out their statutory functions. Some problems still exist which will require continued attention.

PB81-144834 PC **A09**/MF **A01**
Mathematica Policy Research, Inc., Princeton, NJ.
Benefit-Cost Methodology for Studying Apprenticeship Programs.
Final rept.,
Charles D. Mallar, and Craig V. D. Thornton. Dec 80, 187p DLMA-20-34-79-35-2
Contract DL-20-34-79-35

The study develops methods for evaluating the benefits and costs of apprenticeship training. Its main focus is on how to determine whether apprenticeship programs are economically efficient. Other issues that can be addressed by the methodology include the distribution of apprenticeship benefits and costs among apprentices, employer-providers, and other group in society and how the economic efficiency of apprenticeship varies over the course of the training. One of the principal components of the study is the development of techniques for estimating the value of output produced by apprentices during their training. In addition to identifying and developing techniques for estimating the value of various benefits and costs, the study assesses the feasibility of estimation and proposes an agenda for future research.

PB81-145385 PC **A10**/MF **A01**
San Jose State Univ., CA. Dept. of Instructional Technology.
Instructional Technology and Learning Resource Center-Based Community Education,
James W. Brown. 15 Dec 77, 202p AID-PN-AAH-019
Grant AID/1A-G-1169

The report presents excerpts from a survey of literature and descriptions of nonformal community education activities involving specific uses of media for various educational and informational purposes. In addition, recommendations and media utilization techniques and procedures having special application to the Learning Resource Center-Based Community Education Project (LRC-BCES) are also included. It is intended that this paper assist paraprofessional and professional personnel who may be employed in the LRC-BCES programs in Latin America. Though not exhaustive, the survey of literature consists of a fair sample of journalistic opinions, reports of actual experience, and, where available, of field-based objective studies of several different kinds. Three appendices are provided to facilitate the researcher's further study of this topic. Finally, a bibliography of 200 entries (1964-1978) lists all items consulted in the preparation of this study.

PB81-145948 PC **A10**/MF **A01**
Pabon, Sims, Smith and Associates, Washington, DC.
Development and Review of Driver Training Research Needs. Volume I: Research Plan Development.
Final rept. Oct 78-Jul 80,
Esther R. Bowring, Diane M. Sims, and Anita S. Ware. Sep 80, 206p DOT-HS-805 642
Contract DOT-HS-8-02064
See also Volume 2, PB81-145955.

The two-volume Final Report documents the development of a Driver Training Research Plan and presents the final Research Plan as the major product of the project. Volume I, 'Research Plan Development', documents the project methodology utilized in developing the plan. The central featue of the approach was a Driver Training Workshop comprised of Driver Training/Education experts. The Workshop was conducted in order to formulate the Preliminary Research Plan which was subsequently reviewed and evaluated by a Review Board of experts and users in the field. Volume I documents the Driver Training Workshop and the resultant Preliminary Research Plan. Further, it includes the Review Board's content evaluation of the plan as well as a process evaluation of the Driver Training Workshop.

PB81-145955 PC **A08**/MF **A01**
Pabon, Sims, Smith and Associates, Washington, DC.
Development and Review of Driver Training Research Needs. Volume II: Final Recommended Research Plan.
Final rept. Oct 78-Jul 80,
Esther R. Bowring, Diane M. Sims, and Anita S. Ware. Sep 80, 173p DOT-HS-805 643
Contract DOT-HS-8-02064
See also Volume 1, PB81-145948.

The two-volume Final Report documents the development of a Driver Training Research Plan and presents the final Research Plan as the major product of the project. Volume II, 'Final Recommended Research Plan', presents the final Research Plan which is comprised of 14 recommended research topics. The 14 topics are presented in a rank-ordered sequence as derived from the Review Board evaluation process. The topics are presented as follows: Risk Assessment, Teacher Preparation, Hazard Perception, Quality Control, Module Effectiveness, Training Technology Transfer, Performance Standards, Program Supervision Development, Remedial Teacher Preparation, Behavioral Analysis of Accidents, Transferable TSE Program, Computer-Based Training Modules, Psycho-Motor Test, and Alternate Delivery Agency. Final project recommendations are also included in Volume II.

PB81-801789 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Allied Health Personnel: Education, Licensure, and Certification. October, 1978-January, 1981 (Citations from the NTIS Data Base).
Rept. for Oct 78-Jan 81.
Jan 81, 129p
Supersedes PB80-802713, and NTIS/PS-78/1064. See also 1964-September, 1978, PB80-802705.

The bibliography reviews literature on specially trained and licensed health manpower who support, complement, or supplement the professional functions of physicians, dentists, registered nurses, and other health professionals in the delivery of health care. Also included are those personnel who assist environmental engineers and other personnel in environmental health control and preventive medicine activities. The compilation of reports include information on: health occupations and career opportunities; training programs and traineeship grants; curriculum development; and certification, credentialing and licensure. (This updated bibliography contains 122 citations, 47 of which are new entries to the previous edition.)

PB81-801797 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dental Personnel: Manpower Supply, Needs, and Demand. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 130p
Supersedes PB80-802762, and NTIS/PS-78/1081.

References are cited on dental manpower relevant to the following topics: Dentists scarcity areas, recommendations for alleviating these shortages, determinants of current and projected needs, population characteristics as an indicator of demands for services, and dental productivity and organization of dental services. (This updated bibliography contains 121 citations, 18 of which are new entries to the previous edition.)

PB81-801946 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Dentists: Education, Licensure, and Certification. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 109p
Supersedes PB80-802648, and NTIS/PS-78/1077.

The bibliography is a compilation of reports on topics related to dental education--costs, schools, recruitment, incentive programs, and continuing education; licensure, credentialing, certification, and performance assessment. The implications for health manpower planning are discussed. (This updated bibliography contains 102 citations, 31 of which are new entries to the previous edition.)

5J. Psychology (Individual and Group Behavior)

AD-A094 077/5 PC **A07**/MF **A01**
Miami Univ., Oxford, OH. Dept. of Psychology.
Analysis of Dynamic Visual Processing.
Technical rept.,
Allan J. Pantle. Dec 80, 128p AFAMRL-TR-80-117
Contract F33615-77-C-0528

These empirical studies were designed to elucidate the visual mechanisms or channels responsible for the spatiotemporal processing of dynamic imagery. The studies are conveniently placed into four different categories according to the type of display employed. A sustained-transient channels model of visual function was used as the framework for the conduct and interpretation of the experiments. (1) In the first series of studies it was shown that the pattern of masking effects produced by a background of particular spatial frequency content upon a set of test targets cannot be predicted without knowing the temporal characteristics of both the background and target. (2) Studies of the effects of sine-wave adaptation on perceptual organization. Selective adaptation to sine-wave gratings was found to bias the perceptual organization of a bistable spatiotemporal display. (3) Studies with alternating, Julesz-type random-element patterns. In experiments in which the perception of a global subjective figure depended upon local correlations of individual elements in successive time frames, it was found that the clarity of the subjective figure decreased gradually as the orientation difference between elements in the successive frames increased. (4) Studies of dynamic texture processing. The perception of a subjective figure based upon texture cues in a dynamic display was found to depend upon a process which consisted of at least two adaptable components: one component involving a representation or coding of the spatial details of the individual texture elements themselves, and another component involving a representation or coding of the figure as a whole.

AD-A094 083/3 PC **A04**/MF **A01**
Human Resources Research Organization, Alexandria, VA.

Attitudes of Youth Toward Military Service in the All-Volunteer Force: Results from National Surveys Conducted between May 1971 and May 1973.
Consulting rept.,
John R. Goral, and Andrea Lipowitz. May 74, 58p
Rept no. HUMRRO-CR-D7-74-148
Contract F41609-73-C-0030
See also report dated Jul 74, AD-A094 084.

This report presents information, gathered from national samples representative of the population of American male youth 16 to 21 years old, on a variety of topics related to the transition from a draft-reliant to an all-volunteer military force. Data were obtained by means of five interview surveys conducted at 6-month intervals, beginning in May 1971 and concluding in May 1973. The samples used in this research are representative with respect to age, geographical region, and educational status. Results pertaining to the following areas of concern are contained in the report: enlistment intent; incentives to enlistment; deterrents to enlistment; knowledge about military service, Service images; and recruiting. (Author)

AD-A094 084/1 PC **A04**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
Attitudes of Youth Toward Military Service in the All-Volunteer Force: Results from National Surveys Conducted Between May 1971 and November 1973.
Consulting rept.,
John R. Goral, and Andrea Lipowitz. Jul 74, 57p
Rept no. HUMRRO-CR-ED-74-1
Contract F41609-73-C-0030
See also report dated May 74, AD-A094 083.

This report presents information, gathered for national samples representative of the population of American male youth 16 to 21 years old, on a variety of topics related to the transition from a draft-reliant to an all-voluntary military force. Data were obtained by means of six interview surveys conducted at 6-month intervals, beginning in May 1971 and concluding in November 1973. Results pertaining to the following areas of concern are contained in the report enlistment intent; incentives to enlistment; deterrents to enlistment; knowledge about military service; service images; and recruiting. (Author)

AD-A094 135/1 PC **A02**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Arousal and Task Performance: The Ubiquitous U-Curve,
K. C. Hendy. Aug 79, 19p Rept no. ARL/SYS-NOTE-68

It is suggested that arousal is a combination of several relatively independent, imperfectly coupled mechanisms. This view is supported by the extensive literature on the dissociation of the electrocortical, autonomic and behavioural aspects of the arousal paradigm. In the case of electrocortical arousal an inverted U-curve can be demonstrated for tasks involving competing mechanisms (e.g. correct detection/false positives). The nature of this relationship is that arousal level (total) for optimum performance is greater for more difficult discriminations. This apparent contradiction of the Yerkes-Dodson Law is explained in terms of the fear-induced drive peculiar to the experimental situation causing a high level of internal task-related arousal. Thus, measured incentive levels, which provide additional arousal through manipulation of the payoff matrix, may be seen to decrease as discriminations become more difficult. (Author)

AD-A094 146/8 PC **A03**/MF **A01**
Milton S. Hershey Medical Center, Hershey, PA. Dept. of Behavioral Science.
Stress and Incongruity Theory: Effects of Crowding,
Siegfried Streufert, Glenda Y. Nogami, and Susan C. Streufert. Jan 81, 45p Rept no. TR-1
Contract N00014-80-C-0581

This report focuses on crowding as a stress inducer. Incongruity Adaptation Theory (GIAL) is applied to crowding as a predictor of task performance and satisfaction. It is suggested that crowding may produce pleasant and unpleasant social and work environment conditions and may result in improvements or decrements of performance. The conditions which should produce each outcome are specified according to GIAL theory predictions. Joint effects of crowding and other stressors are considered. (Author)

AD-A094 149/2 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Performance Models for Spatial and Locational Cognition.
Final rept. Oct 77-Sep 80,
Perry W. Thorndyke, and Barbara Hayes-Roth. Dec 80, 37p Rept no. RAND/R-2676-ONR
Contract N00014-78-C-0042

Summarizes a three-year investigation of the knowledge and processes people use to learn and make spatial judgments in large-scale environments. Experiments in map learning indicated that both the use of effective study procedures and visual memory ability determine success at learning a map. All but low-ability people benefit from training in effective study procedures. Studies of people's procedures for accuracy at estimating distances on maps indicated that map clutter increases subjective distance between two points. A third series of studies investigated differences in the knowledge people acquire from navigation and from map learning. Studying a map leads to a global representation of the environment, while navigation provides a linear, or procedural representation. Navigation experience is optimal for estimating route distances and orienting oneself toward unseen locations. Map learning is optimal for estimating the shortest distance between two points and determining relative locations of objects. (Author)

AD-A094 179/9 PC **A02**/MF **A01**
Frank J. Seiler Research Lab., United States Air Force Academy, CO.
Brief Treatment of Test Anxiety with Cognitive Modification.
Final rept. Oct 79-Dec 80,
Richard L. Huges, and Larry L. Wheeler. Dec 80, 12p Rept no. FJSRL-TR-80-0021

Cognitive modification has become a popular treatment for test anxiety. Unlike other treatments, it has led to improvements in academic performance as well as to decreases in test anxiety. The present study evaluated a brief cognitive modification treatment of test anxiety which was approximately one-half as long as previous effective treatments. This four session treatment led to significant decreases in test anxiety relative to a relaxation control group and a no treatment control group but not to improvement on the WAIS Digit Symbol subtest. Neither was there any improvement in treatment groups in GPA after treatment or one year later. There was improvement in GPA in the no treatment control group. (Author)

AD-A094 253/2 PC **A03**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Div. of Behavioral Biology.
Event Time-Series Applications to the Analysis of Behavioral Events.
Technical rept.,
R. L. Ray, M. J. Nellis, and H. H. Emurian. 21 Jan 81, 34p Rept no. TR-1
Contract N00014-80-c-0467

This report discusses the application of event time-series techniques to the analysis of a series of behavioral events. These techniques can be used to supplement more traditional methods of data presentation, such as the cumulative record. The event time-series procedures presented involve the estimation of numerical coefficients and the generation of specialized graphical displays which can be used to characterize the complex organizational systems.

AD-A094 406/6 PC **A04**/MF **A01**
California Univ., Los Angeles. Cognitive Systems Lab.
GODDESS: A Goal-Directed Decision Structuring System.
Technical rept.,
Judea Pearl, Antonio Leal, and Joseph Saleh. Jun 80, 66p Rept no. UCLA-ENG-CSL-8034
Contract N00014-78-C-0372

This report describes a preliminary operational version of a computerized, domain-independent, decision support system which is based on a novel, goal-directed structure for representing decision problems. The structure allows the user to state relations among aspects, effects, conditions, and goals, in addition to actions and states which are the basic components of the traditional decision tree approach. The program interacts with the user in a stylized English-like dialogue, starting with the stated objectives and proceeding to unravel the more detailed means by which these objectives can be realized. At any point in time, the program focuses the user's attention on the issues which are most crucial to the problem at hand. The structure used is more compatible with the way people encode knowledge about problems and actions and, therefore, promises to offer the following advantages: judgments and beliefs issued by the user would constitute a more valid representation of the user's experience, and the user may be guided toward the discovery of action alternatives he otherwise would not have identified. (Author)

AD-A094 407/4 PC **A03**/MF **A01**
California Univ., Los Angeles. Cognitive Systems Lab.
On the Value of Synthetic Judgments. Revision.
Technical rept.,
Michael Burns, and Judea Pearl. Dec 80, 31p
Rept no. UCLA-ENG-CSL-8032-REV
Contract N00014-78-C-0372
Revision of report dated Jun 80.

Decision-support technologies are founded on the paradigm that direct judgments are less reliable and less valid than synthetic inferences produced from more fragmentary judgments. Moreover, certain types of fragments are normally assumed to be more valid than others. In particular, judgments about the likelihood of a certain state of affairs given a particular set of data (diagnostic inferences) are routinely fabricated from judgments about the likelihood of that data given various states of affairs (causal inferences), and not vice versa. This study was designed to test the benefits of causal synthesis schemes by comparing the validity of causal and diagnostic judgments against ground-truth standards.

AD-A094 420/7 PC **A02**/MF **A01**
New Mexico State Univ., Las Cruces. Behavioral Engineering Lab.
Differences among Myopes, Emmetropes, and Hyperopes.
Technical rept.,
Valerie J. Gawron. Apr 80, 16p BEL-80-1/AFOSR-80-1, AFOSR-TR-81-0081
Grant AFOSR-80-0024

Investigations of differences among myopes, emmetropes, and hyperopes have included comparisons of physical characteristics, scholastic achievement, and personality traits. In the first area, there seems to be no support for the caricature of the small, weak myope and the tall, strong hyperope. Research relating scholastic achievement to refractive error, however, reinforces the popular stereotype of the studious myope. Finally, myopes and hyperopes seem to have distinct personalities. Myopes are overcontrolled and introverted; hyperopes, impulsive and extraverted. These personality types and thus perhaps myopia and hyperopia, may be associated with distinct patterns of physiological functioning. Finally, myopes and hyperopes may vary in dark focus, near point, and visual amplitude. The purpose of the present research was to examine differences in these five areas among myopes, emmetropes, and hyperopes. (Author)

AD-A094 477/7 PC **A03**/MF **A01**
Minnesota Univ., Minneapolis. Computerized Adaptive Testing Lab.
An Alternate-Forms Reliability and Concurrent Validity Comparison of Bayesian Adaptive and Conventional Ability Tests.
Research rept.,
G. Gase Kingsbury, and David J. Weiss. Dec 80, 29p Rept no. RR-80-5
Contracts N00014-76-C-0243, N00014-79-C-0172

Two 30-item alternate forms of a conventional test and a Bayesian adaptive test were adminstrated

by computer to 472 undergraduate psychology students. In addition, each student completed a 120-item paper-and pencil test, which served as a concurrent validity criterion test, and a series of very easy questions designed to detect students who were not answering conscientiously. All test items were five-alternative multiple-choice vocabulary items. Reliability and concurrent validity of the two testing strategies were evaluated after the administration of each item for each of the tests, so that trends indicating differences in the testing strategies as a function of test length could be detected. For each test, additional analyses were conducted to determine whether the two forms of the test were operationally alternate forms. Results of the analysis of alternate-forms correspondence indicated that for all test lengths greater than 10 items, each of the alternate forms for the two test types resulted in fairly constant mean ability level estimates. When the scoring procedure was equated, the mean ability levels estimated from the two forms of the conventional test differed to a greater extent than those estimated from the two forms of the Bayesian adaptive test. The alternate-forms reliability analysis indicated that the two forms of the Bayesian test resulted in more reliable scores than the two forms of the conventional test for all test lengths greater than two items. This result was observed when the conventional test was scored either by the Bayesian or proportion-correct method.

AD-A094 478/5 PC **A03**/MF **A01**
Minnesota Univ., Minneapolis. Computerized Adaptive Testing Lab.
A Comparison of Adaptive Sequential, and Conventional Testing Strategies for Mastery Decisions.
Research rept.,
G. Gage Kingsbury, and David J. Weiss. Nov 80, 37p Rept no. RR-80-4
Contract N00014-79-C-0172

Two procedures for making mastery decisions with variable length tests and a conventional mastery testing procedure were compared in Monte Carlo simulation. The simulation varied the characteristics of the item pool used for testing and the maximum test length allowed. The procedures were compared in terms of the mean test length needed to make a decision, the validity of the decisions made by each procedure, and the types of classification errors made by each procedure. Both of the variable test length procedures were found to result in important reductions in mean test length from the conventional test length. The Sequential Probability Ratio Test (SPRT) procedure resulted in greater test length reductions, on the average, than the Adaptive Mastery Testing (AMT) procedure. However, the AMT procedure resulted both in more valid mastery decisions and in more balanced error rates than the SPRT procedure under all conditions. In addition, the AMT procedure produced the best combination of test length and validity. (Author)

AD-A094 537/8 PC **A04**/MF **A01**
Bernard M. Baruch Coll., New York. Psychophysiology Lab.
Brain Responses and Information Processing I. Hemispheric Asymmetries in Event Related Potentials during Signal Detection.
Annual rept. no. 1, 1 Oct 79-30 Sep 80,
John L. Andreassi, Charles S. Rebert, and Ferol F. Larsen. 30 Nov 80, 63p AFOSR-TR-81-0078
Contract F49620-80-C-0013

Event-Related Potentials (ERPs) were recorded from over the two cerebral hemispheres (occipital and parietal areas) during a 78 minute vigilance task. Twelve right-handed male subjects served in two experimental sessions. These subjects focussed on a central fixation point and responded to signals presented at unpredictable times in one of three locations: 2.5 deg. to right of the central fixation, central, and 2.5 deg to the left of center. Subjects decided whether to press a response key with either the left or right hand with each presentation. Signals were letter Ts oriented either right-side up or upside down. Six responded to T-up with right hands and six did the opposite. The ERPs were recorded from two scalp areas over left and right occipital cortex, and two sites above left and right parietal areas. Vertical and horizontal eye movements were also recorded. Two major ERP components emerged: a negative peak occurring at about 180 msec. after the stimulus, and a positive component appearing at about 320 msec. ERP latency asymmetries occurred at all recording sites as a function of visual field of stimulation. That is, for the N180 component stimuli presented in the left visual field (LVF) resulted in shorter latency ERPs at the contralateral (right) hemisphere than at the ipsilateral (left) hemisphere. A contralateral advantage was also observed for stimuli presented in the RVF.

NUREG/CR-1614 PC **A15**/MF **A01**
Oak Ridge National Lab., TN.
Approaches to Acceptable Risk: A Critical Guide,
Baruch Fischhoff, Sarah Lichtenstein, Paul Slovic, Ralph Keeney, and Stephen Derby. Dec 80, 336p ORNL/SUB-7656/1
Contract W-7405-eng-26
Prepared in cooperation with Decision Research, Eugene, OR., Woodward-Clyde Consultants, San Francisco, CA., and Stanford Univ., CA.

Acceptable-risk decisions are an essential step in the management of technological hazards. The absence of an adequate decision-making methodology is neither good for hazard management nor good for society. This report offers a critical analysis of the viability of various approaches as guides to acceptable-risk decisions. It does so by (1) Defining acceptable-risk decisions and examining some frequently proposed, but inappropriate, solutions. (2) Characterizing the essential features of acceptable-risk problems that make their resolution so difficult. (3) Creating a taxonomy of decision-making methods, identified by how they attempt to address the features of acceptable-risk problems. (4) Specifying the objectives that an approach should satisfy in order to guide social policy. (5) Rating the success of the approaches in meeting these objectives.

PB81-134603 Not available NTIS
National Bureau of Standards, Washington, DC.
Psychological Aspects of Firesetting,
Robert G. Vreeland, and Bernard M. Levin. 1980, 16p
Pub. in Chapter 3 in Psychological Aspects of Firesetting, p31-46 1980.

The purpose of this chapter is to examine some of the psychological factors involved in firesetting and arson. Although arson is a major problem and has been an area of behavioral research for over a century, the authors still know very little about its etiology and even less about its treatment. This paper summarizes the research literature and discusses: (1) types and motives of firesetters, (2) intellectual and academic performance of firesetters; (3) psychopathology of firesetting; and (4) treatment.

PB81-802936 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biofeedback. 1966-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1966-Jan 81.
Jan 81, 80p
Supersedes PB80-803117, and NTIS/PS-78/1301.

Research reports on self-regulation of psychological and physiological processes are cited. Studies on learned control of blood pressure, motor reactions, brain waves, heart rate, and body temperature are included. (This updated bibliography contains 66 citations, 5 of which are new entries to the previous edition.)

5K. Sociology

AD-A094 224/3 PC **A03**/MF **A01**
Army Facilities Engineering Support Agency, Fort Belvoir, VA. Technology Support Div.
Family Housing Utility Metering Program Annual Report. Phase II. Data Analysis.
Final rept. for FY 1979,
Adam F. Renner. Mar 80, 34p Rept no. USAFESA-TSD-2082

See also Phase 1, AD-A070 298.

The Family Housing Utility Metering Program was a quad-service DoD Program directed by Congress to determine the actual energy consumption in approximately 10,000 family housing units in military installations. The pilot program extended over a period of about 18 months in FY 78-80 with a final report submitted to Congress on 1 March 1980. The following report covers the data processing portion of the program and includes the Family Housing Survey on the three Army posts, namely, Yuma PG, AZ, Fort Gordon, GA, and Fort Eustis, VA, together with a brief description of the method used to calculate energy consumption norms, the computer output of energy consumptions and the conclusions derived from the program that were reported to Congress by the DoD. At the conclusion of the test activity, no further plans were in effect to continue the Family Housing Metering Program and, for this reason, the Program officially terminated on 1 March 1980. The data bank and associated documents will be kept on file until 31 March 1985. (Author)

HRP-0902647/7 PC **A05**/MF **A01**
Texas Senate Special Committee on Delivery of Human Services, Austin.
The Potential in the Patchwork: A Future Pattern for Human Services in Texas.
Nov 80, 95p

Seventy-two recommendations are made to promote coordination and cost-effectiveness in the delivery of human services in Texas. After describing the organization and basic research of the committee, the document discusses the nature of the service patchwork as it currently exists. Areas of omissions in service, incongruities in statutes, and fragmentation of services are presented together with recommendations for restructuring certain mechanisms of service delivery. Needs and problems are linked to a growing and changing population and the increasing influence of the Federal Government. Specific recommendations are presented for juvenile and elderly segments of the population. Suggestions are made regarding managing Federal funds and interacting with Federal regulations. Problems in agency governance are related to state policy development, state agency planning and interactions, and agency accountability. To govern agencies effectively, to balance external forces in the future, and to transform the patchwork of services into a pattern, the report recommends a comprehensive policy planning and coordination mechanism. An alphabetical list of recommendations is included.

PB81-135089 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Survey of Visual Acuity of Drivers,
P. A. Davison, and A. Irving. c1980, 25p TRRL-LR-945
Also pub. as ISSN-0305-1293.

Data are presented on the distribution of binocular visual acuity for 1368 drivers at 25 sites using a British Standard test chart rather than a vision screening device. Assuming that the Department of Transport number plate test is equivalent to an acuity standard of between 6/12 and 6/9, it is estimated that between 1 per cent and 3 per cent of all drivers would fail the test at any given moment. Acuity was found to decline with age for drivers aged over 40 years. Five per cent and 10 per cent respectively of drivers aged 65 or over failed to meet the criteria of 6/12 and 6/9. A quarter of all drivers tested were actually wearing spectacles or contact lenses prior to driving up to the testing station; only 15 (4 per cent) of these drivers were wearing contact lenses. Questionnaire responses indicated that 64 per cent of all drivers claimed to have had some form of eye test within the previous 3 years. The effects on drivers' acuity of type and use of optical prescription, and of length of time since last eye examination, are reported. (Copyright (c) Crown Copyright 1980.)

PB81-135113 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
The Social Distribution of Mobility and Travel Patterns,
S. W. Town. c1980, 42p TRRL-LR-948

Also pub. as ISSN-0305-1293.

The report reviews findings of recent British studies on the social distribution of personal mobility and travel patterns, and supplements them with data from the 1975/76 National Travel Survey. The situation of four social groups with low mobility is analyzed in detail; these are young people, housewives, the elderly and the poor. (Copyright (c) Crown Copyright 1980.)

PB81-144412 PC **A05**/MF **A01**
Economisch Inst. voor de Bouwnijverheid, Amsterdam (Netherlands).
De Ontwikkeling van de Woningkwaliteit (The Development of Quality in Housing),
P. J. van den Broek. Sep 79, 80p
Text in Dutch. Summary in English.

No abstract available.

PB81-144529 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Child Care Food Program: Better Management Will Yield Better Nutrition and Fiscal Integrity.
6 Jun 80, 77p CED-80-91

The Department of Agriculture's Child Care Food Program has grown from a $1.2 million pilot program in 1969 to a $250 million program in 1980. Improved management is necessary to ensure that nutritious meals are served to children at healthful feeding sites, that sound fiscal accountability is maintained, and that incidents of fraud and abuse are obviated. Improved management is also essential to ensure that recently implemented legislation will expand program benefits without exacerbating existing problems or adding unnecessarily to program cost.

PB81-145088 PC **A05**/MF **A01**
Vermont Water Resources Research Center, Burlington.
River Recreation Use and Analysis of Carrying Capacity.
Research technical completion rept. 1 Oct 77-31 Jan 80,
Robert E. Manning. 1 Oct 80, 93p W81-00972, OWRT-A-034-VT(1)
Contract DI-14-34-0001-9048

The major objectives of this study were to describe the nature and intensity of river recreation activity in Vermont and to develop methods for determining the social carrying capacity of rivers for recreation. The principal research method was a field survey of recreationists on four major Vermont rivers during the spring and summer of 1978. Substantial dissatisfaction was found among river users with regard to selected river use problems and conflicts.

PB81-145328 PC **A07**/MF **A01**
Bureau of the Census, Washington, DC.
Illustrative Projections of World Populations to the 21st Century, Current Population Reports.
Special study series.
Jan 79, 129p P-23/79

The population projections presented in this report were originally prepared for the Council on Environmental Quality as part of an overall study to assess the probable changes in the world's population and the resulting demands that would be made on the natural resources and the environment through the end of the century. Projections of the population of the world and of selected regions and countries to the year 2000 are shown in high-medium-low series form as a way of acknowledging the uncertainty which is necessarily involved. The effective base date for the projections in this report is generally July 1, 1975. A brief introductory text contains population projections for the world, major regions, selected countries, and the age structure prepared by the Census Bureau; some alternative projections by other organizations; a discussion of projection methods; and a section on definitions and explanations of terms. The medium Census Bureau projection for the year 2000 envisions a world population of 6.35 billion persons. Medium projections included by other organizations range from 5.883 to 6.254 billion persons. The ratio of persons in less developed to developed regions will be roughly 4:1. The remainder of the volume is taken up with detailed tables concerning population and its distribution; age and sex structure; growth, birth, death, and total and age-specific fertility rates; life expectancy; and alternative population projections.

PB81-145336 PC **A08**/MF **A01**
AMARU IV Cooperative, Inc., Washington, DC.
Appropriate Technology for the Bolivian Campesino: A Background Social Feasibility Study,
Leslie A. Brownrigg, Inge Maria Harman, and Roger Neil Rasnake. 2 Nov 79, 162p AID-PN-AAH-032
Contract AID-511-193-T

The report presents research data relevant to the design of an appropriate technology project in Bolivia. Parts II and III of the report are studies of the Yura and Huaytu communities in Potosi and Santa Cruz, respectively. These two sections are divided into discussions of social organization, current technology and production, and recommendations for the proposed appropriate technology project. Recommendations concerning specific types of appropriate technology to be promoted are presented by subject area-agriculture, food processing, energy, sanitation, diet, water, and housing. Specific technologies for these subject areas are included in the appropriate technology sections of the Yura and Huaytu community studies. A 21-item bibliography of references cited (1951-1978) is appended to the report.

PB81-145641 PC **A02**/MF **A01**
Staedtebauinstitut-Forschungs-Gesellschaft m.b.H., Nuernberg (Germany, F.R.).
Special Modes of Housing and Communal Facilities,
Guenther G. Woerdemann. 1979, 23p

No abstract available.

PB81-149098 PC **A05**/MF **A01**
Waterloo Univ. (Ontario).
Some Facets of Rural Poverty in Colombia.
General working document no. 2,
Wayne R. Thirsk. Jul 78, 82p AID-PN-AAH-137

The working paper describes the characteristics of the rural poor in Colombia, measures empirically the extent of their poverty, and assesses how their standards of living have been affected by economics growth. Generally addressing relevant issues of the rural poor, this paper reviews previous studies and collected data, and comments on the quality and methods of these existing studies and where they diverge from one another. The paper examines more closely trends in the distribution of rural wealth, the typically low consumption of health, housing, and educational services, and non-economic indicators of rural poverty, such as infant mortality and illiteracy. Comparative tables, accompanied by descriptive text, indicate differences in incomes of the rural poor by occupation, region, sex, and economic status (landowners, sharecroppers, etc.). After considering the evidence of rural poverty on an aggregate level, the report focuses on case studies of the economic behavior of the small farmers and the variety of income distribution policies directed to them.

PB81-149650 PC **A09**/MF **A01**
Agency for International Development, Washington, DC.
Yaounde Household and Housing Characteristics. Volume I: Synthesis of Data Housing Policy Implications. Volume II: Results of the Survey. Volume III: House Case Studies.
Feb 78, 177p
Portions of this document are not fully legible.

In order to formulate valid low-income housing proposals intended for low-income households, it was necessary to collect, in a relatively short time, data on the existing housing stock, and the socio-economic and physical living conditions of the populations concerned. To accomplish this task, a housing typology was established, based on different urban fabrics each with identifiable physical characteristics, and socio-economic surveys were carried out for each of the types.

PB81-151987 PC **A03**/MF **A01**
Ghana Univ. Medical School, Accra.
An Analysis of the Characteristics of Households, Household Size, Household Heads and the Relationship within the Households,
G. M. K. Kpedekpo, K. Asuming, S. N. Blumenfeld, F. K. Wurapa, and D. W. Belcher.
Mar 75, 31p MONO SER-8, AID-PN-AAH-261
Prepared in cooperation with California Univ., Los Angeles. School of Public Health.

This analytical survey, containing extensive data collected on the patterns of home life in Ghana, has been compiled for use as a comprehensive rural health and family planning project. The Danfa region, in which this project is conducted, has been divided into four survey areas and includes the survey of approximately 50,000 rural inhabitants ranging 10 to 50 miles from Accra. Topics of the demographic survey include: characteristics of households and houses; relationships within the households; characteristics, and marital and occupational status of heads of households; and characteristics of heads of households of selected ethnic groups by religion, occupation, and relationship to head of household. Statistics are presented in tabular form by subarea, with short, narrative summaries analyzing the results under each topic. Extracted from the concluding section summarizing the main findings, it was demonstrated that while the average size of a household varies little between the four project areas (4.1 in Area II to 5.4 in Area IV), the average number of persons per house varies considerably, ranging from 5.9 persons per house in Areas II and III to 13.0 persons per house in Area IV. Additionally, farming and fishing are the primary occupations for all areas, but these activities vary in proportion from one area to the next. Heads of households tend to be male in both single and multiple member households; female heads of households suffer more frequently from divorce and widowhood than their male counterparts.

PB81-802043 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Economic Development of Ethnic Minorities. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 276p
Supersedes PB80-802242, and NTIS/PS-78/1204.

Many aspects of the economic conditions of nonwhite ethnic minorities in the U.S. are reported. Racial groups are American Indians, Negroes, Chinese Americans, Japanese Americans, other Orientals, Mexican Americans, Puerto Ricans, Filipinos, and Eskimos. Materials are given on income and wages, legislative actions, central city problems, rural areas, black-white comparisons, employment, underemployment, unemployment, programs, finance, community development, econometrics, sociometrics, housing relations, and poverty. References are made to industrial relations, but minority business and entrepreneurship are in general excluded since these are documented in a separate bibliography. (This updated bibliography contains 270 citations, 27 of which are new entries to the previous edition.)

PB81-802050 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Behavior and Psychology as Related to Law Enforcement and Criminology. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 276p
Supersedes PB80-802861, and NTIS/PS-78/1175.

Studies are cited on various aspects of the behavior and psychology of criminals, police, juvenile delinquents, rioters, and prisoners. Some of the specific topics covered include social psychology, criminal psychology and behavior, behavior connected with illegal drugs, public psychology, and group behavior in prisons and riot situations. (This updated bibliography contains 269 citations, 20 of which are new entries to the previous edition.)

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A094 131/0 PC **A02**/MF **A01**
Naval Submarine Medical Research Lab., Groton, CT.
Vitamin C Status of Submariners.
Interim rept.,
Sara C. Gilman, Robert J. Biersner, and R. D. Thornton. 19 Jun 80, 17p Rept no. NSMRL-933

Plasma vitamin C levels were determined for 28 submariners prior to, during, and after a 68-day patrol. A significant reduction occurred in plasma vitamin C levels during the patrol compared to levels obtained before and after the patrol. These reductions were unrelated to health and performance effects as determined by total dispensary visits, frequency of upper respiratory infections, and training accomplishments. Smokers had significantly lower levels of plasma vitamin C than non-smokers, as did those who had made several previous patrols. Vitamin supplements did not appear to ameliorate the vitamin C deficiency found among smokers, but did enhance the plasma levels of vitamin C among non-smokers. These findings indicate that dietary or supplemental intake of vitamin C among submariners should be increased, especially among those who smoke or who have made several patrols. (Author)

IAEA-R-2245-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Method for the Determination of a New Indicator Proportional to the Plasma Concentration of Free Thyroxine. Final Report for the Period 1 November 1978-31 October 1979.
G. Deutsch. Nov 79, 6p
U.S. Sales Only.

A novel method for the estimation of free thyroxine (T sub 4) in serum is described. Partially heat-denatured serum is mixed with exp 125 I-labelled T sub 4 bound to thyroxine-binding globulin (TBG) on a Sephadex column. After a period of equilibration, the column is eluted with buffer and the residual radioactivity on the column measured. This represents the fraction of exp 125 I-labelled T sub 4 freed from TBG and can be related to the concentration of free T sub 4 in the serum, being expressed as "proportional free thyroxine" (PFT sub 4) in mu g per 100 ml. In studies of the method, a coefficient of variation of 4.52% in the results was found. The mean PFT sub 4 value in 124 normal subjects was 7.26 +- 1.25 mu g per 100 ml. Values below 4.8 mu g per 100 ml were considered indicative of hypothyroidism and those above 9.8 mu g per 100 ml indicative of hyperthyroidism, in good agreement with clinical findings. The coefficient of correlation between the results and results obtained by the AMES "Tetralute" method was 0.911. The mean PFT sub 4 value in 37 pregnant subjects was 12.2 +- 2.1 mu g per 100 ml. (Atomindex citation 11:531618)

PB81-930900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Hormones in Cancer-Related Biology: Steroid Hormones.
Cancergram CB07.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The scope of this Cancergram is comprehensive coverage of steroid biochemistry, metabolism, and effects on tumors. Of primary interest are androgens, estrogens, progestagens, corticosteroids, and their respective metabolites and breakdown products. Synthetic steroids will also be noted when they are used nontherapeutically in cancer-related studies. Complementary to this series is Cancergram series CB24, covering the cancer-related biology of nonsteroid hormones. Studies specifically concerning steroid hormone-related carcinogenesis are generally excluded here, as they are covered by Cancergram series CK05.

PB81-931400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology: Cyclic Nucleotides.
Cancergram CB14.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns the role of cyclic nucleotides and their derivatives in a wide variety of cellular processes in neoplastic cells and tissues, and related studies in normal cell systems which contribute to an understanding of cyclic nucleotide metabolism and role in neoplasia. Specific areas of emphasis are the effects of cyclic nucleotides on regulations of growth and differentiation, and on membrane properties of normal and neoplastic cells. Regulation of cyclic nucleotide levels and metabolism, and studies of cyclic nucleotide-dependent protein kinase activity in cancer cells and tissues, are also within scope.

PB81-932400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Hormones in Cancer-Related Biology: Non-Steroid Hormones.
Cancergram CB24.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all nonsteroid hormones, including circulating protein and protein-derived hormones, and hypothalamic peptide inhibitory and releasing factors. Other hormones of interest are placental hormones and specific organ effectors, such as the secretingastrin system, vasoactive peptides, biogenic amines, and the poietins. Studies concerning synthesis, maturation, and binding of nonsteroid hormones are included. Emphasis is on effects of these hormones on basic cell metabolism and growth, and the relationship of these substances to the development and progression of tumors. Studies dealing directly with carcinogenic effects of hormones are largely excluded, however, as this subject is comprehensively covered by Cancergram CK05. Interrelationships with steroids are in scope; however, most studies concerning the cancer biology of steroid hormones are covered in Cancergram CB07.

6B. Bioengineering

CEA-CONF-4843 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Proton Scanner.
G. Charpak, J. C. Duchazeaubeneix, and J. C. Faivre. 1979, 5p CONF-7909156-1
Symposium on computerized tomography of the brain, Bordeaux, France, 20 Sep 1979.
U.S. Sales Only.

The scanner is based on the nuclear scattering of high energy protons by the nucleons (protons and neutrons) included in the atomic nuclei. It has been described elsewhere and we just recall here the main properties. The future improvements are notified. (Atomindex citation 11:532130)

PATENT-4 212 297 Not available NTIS
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Micro-Fluid Exchange Coupling Apparatus.
Patent,
J. E. Johnson, Jr., and P. F. Swartz. Filed 16 Oct 78, patented 15 Jul 80, 6p N81-14605/2, PAT-APPL-951 422
Supersedes PAT-APPL-951 422-78, N78-33717 (16 - 24, p 3257).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

In a macro-fluid exchange, a hollow needle, such as a syringe needle, is provided for penetrating the fluid conduit of the animal. The syringe needle is coupled to a plenum chamber having an inlet and outlet port. The plenum chamber is coupled to the syringe needle via the intermediary of a standard quick disconnect coupling fitting. The plenum chamber is carried at the end of a drive rod which is coupled to a micrometer drive head. The micrometer drive head is slidably and pivotably coupled to a pedestal for adjusting the height and angle of inclination of the needle relative to a reference base support. The needle is positioned adjacent to the incised trachea or a blood vessel of a small animal and the micrometer drive head is operated for penetrating the fluid conduit of the animal.

PB81-802142 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biotelemetry. 1970-December, 1978 (Citations from the NTIS Data Base).
Rept. for 1970-Dec 78.
Jan 81, 246p
Supersedes PB80-802093, and NTIS/PS-78/1269.

The selected abstracts of research reports cover biomedical information systems, biometeorology, animal and bird migrations, bioinstrumentation, electrocardiography, ecology, and electroencephalography as related to biotelemetry. (This updated bibliography contains 237 citations, none of which are new entries to the previous edition.)

PB81-802159 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biotelemetry. January, 1979-December, 1980. (Citations from the NTIS Data Base).
Rept. for Jan 79-Dec 80.
Jan 81, 33p
Supersedes PB80-802093, and NTIS/PS-78/1269.

The selected abstracts of research reports cover biomedical information systems, biometeorology, animal and bird migrations, bioinstrumentation, electrocardiography, ecology, and electroencephalography as related to biotelemetry. (This updated bibliography contains 26 citations, 16 of which are new entries to the previous edition.)

PB81-802183 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biotelemetry. January, 1978-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 78-Dec 80.
Jan 81, 64p
Supersedes PB80-802101, and NTIS/PS-78/1271. See also 1970-December, 1977, NTIS/PS-78/1270.

Citations of worldwide research are covered in this bibliography on biotelemetry. Included are studies on the use of biotelemetry in biomedical information systems, biometeorology, animal and bird migrations, bioinstrumentation, electrocardiography, ecology, and electroencephalography. (This updated bibliography contains 58 citations, 23 of which are new entries to the previous edition.)

6C. Biology

AD-A094 230/0 PC **A03**/MF **A01**
Gulf Coast Research Lab., Ocean Springs, MS.

A Key to the Fishes of Mississippi Sound and Adjacent Waters,
J. William Cliburn. 1974, 40p

It is intended that this key will be useful in identifying the species of fishes normally occurring in Mississippi Sound. In addition, certain species commonly landed at Mississippi ports, but not found within the Sound, are included. No attempt is made to include fishes commonly occurring in fresh waters but often taken in brackish waters of Mississippi Sound, as these fishes are adequately keyed elsewhere (Eddy 1969). Certain species which occur within the limits of Mississippi Sound may be inadvertently omitted. Some occasional stragglers into the area are included, although they may be taken only rarely. Some discrepancies in nomenclature may occur, but nomenclature and systematic arrangement generally follow that of Bailey et al (1970).

AD-A094 248/2 PC **A05**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Biological Assessment of Upper Mississippi River Sediments.
Final rept.,
Richard Peddicord, Henry Tatem, Alfreda Gibson, and Susan Pedron. Dec 80, 87p Rept no. WES/MP/EL-80-5

The objective of this study was to determine the potential for polychlorinated biphenyls (PCB) and metals to bioaccumulate in the tissues of fish and invertebrates as a result of exposure to sediment from various dredging sites in the upper Mississippi River area. The acute toxicity of these sediments was of secondary interest. Water fleas (Daphnia), catfish, and bluegills were exposed to suspensions of fine-grained sediment from three test sites and one reference site for 4 to 6 days, approximately the duration of a typical dredging and disposal operation on the upper Mississippi River. Survival and tissue concentrations of contaminants in fish were determined after exposure. Fawnfoot and threeridge clams, mayfly larvae, and amphipods were exposed to deposited sediments for up to 14 days, after which survival and contaminant concentrations in tissues of clams were determined. All three test sediments were of low toxicity to all species except the amphipods, in that no sediment produced statistically greater mortality than occurred in the controls and reference sediment. Although statistical comparisons were not made, amphipod mortality in some Upper Mississippi River sediments apparently exceeded that in the controls but probably not that in the reference sediment. Bioaccumulation was the exception, rather than the rule, with 72 species-sediment-contaminant combinations being studied and bioaccumulation potential being indicated in 8 (11 percent) of the cases. Even in these cases, resulting concentrations were below those considered likely to cause adverse impacts.

BNL-51129 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
ESUSA: US Endangered Species Distribution File.
J. Nagy, and C. E. Calef. Oct 79, 71p
Contract AC02-76CH00016

This report describes a file containing distribution data on endangered species of the United States of Federal concern pursuant to the Endangered Species Act of 1973. Included for each species are (a) the common name, (b) the scientific name, (c) the family, (d) the group (mammal, bird, etc.), (e) Fish and Wildlife Service (FWS) listing and recovery priorities, (f) the Federal legal status, (g) the geographic distribution by counties or islands, (h) Federal Register citations and (i) the sources of the information on distribution of the species. Status types are endangered, threatened, proposed, formally under review, candidate, deleted, and rejected. Distribution is by Federal Information Processing Standard (FIPS) county code and is of four types: designated critical habitat, present range, potential range, and historic range. (ERA citation 06:005284)

PB81-134876 PC **A02**
Massachusetts Inst. of Tech., Cambridge. Sea Grant Coll. Program.
Effects of Temperature Conditioning on Development and Germination of 'Gonyaulax tamarensis' (Dinophycese) Hypnozygotes,
Donald Mark Anderson. 28 Jul 79, 8p MITSG-80-16J, NOAA-80120902
Grants NOAA-04-7-158-44079, NOAA-04-8-MO1-149
Pub. in Jnl. of Phycol. 16, p166-172 1980. Prepared in cooperation with Woods Hole Oceanographic Institution Contrib. No. 4344.

Plankton samples from a dense bloom of the toxic red tide dinoflagellate Gonyaulax tamarenis Lebour were incubated in the laboratory to study the formation and development of thick-walled, overwintering cysts. Samples contained very few cysts, and fusing cells were seen only twice. However, thousands of elongate cysts were formed from large posteriorly biflagellated cells (presumed to be planozygotes) that comprised approximately 50% of the initial motile population. Development of these new cysts (hypnozygotes) was studied under different storage conditions.

PB81-135311 PC **A02**/MF **A01**
Southeast Asian Fisheries Development Center, Iloilo (Philippines). Aquaculture Dept.
Traditional Devices and Gear for Collecting Fry of 'Sugpo' Giant Tiger Prawn, 'Penaeus monodon' in the Philippines.
Technical rept. no. 4,
Hiroshi Motoh. May 80, 21p
Also pub. as ISSN-0115-4710.

Eight typical devices and gears for catching the wild fry of the giant tiger prawn, Penaeus monodon, locally called sugpo are described and illustrated. There are three stationary ones viz. fry lure, fry filter net and set fry trap, and five mobile ones viz. scoop net, fry scare line, fry seine, triangular net, and fry bulldozer. These have been used traditionally in the Philippines. This design and manner of operation are adapted to the behaviors and habits of the sugpo fry such as clinging and incursion with the incoming tidal current in mangrove creeks or at the mouth of the brackish river.

PB81-140956 PC **A04**/MF **A01**
Florida Univ., Gainesville. Dept. of Food and Resource Economics.
The Florida Commercial Blue Crab Industry: Landings, Prices and Resource Productivity,
Paul D. Landrum, and Fred J. Prochaska. Aug 80, 57p FSG-34, NOAA-80111406
Grant NOAA-04-8-M01-76

Blue crab production in Florida ranked third in the U.S. in 1975 with an annual volume of approximately 17 million pounds and a value of $2.2 million. In terms of value the blue crab fishery in Florida has been a growing industry worth over one million annually at dockside since 1959. However, total Florida landings, cycling approximately every five years, have been on an overall declining trend since 1964. Increases in dockside prices have more than compensated for the overall decline volume. In summary, total blue crab production in Florida declined on both coasts during the last several years.

PB81-144024 PC **A05**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
Results of Blue Crab Studies at Chalk Point.
Final rept. 1978-79,
P. A. Souza, T. T. Polgar, R. E. Miller, and A. F. Holland. Nov 80, 94p PPSP-CP-80-10
Prepared in cooperation with Maryland Univ., Cambridge. Center for Environmental and Estuarine Studies.

This report summarizes the findings of two years of blue crab tagging studies conducted in the Patuxent estuary near the Chalk Point power plant. This report is organized in the following manner: An introduction and objectives section that defines the objectives of the blue crab study, discusses the modes of interaction between blue crabs and power plant operations, and discusses the life history characteristics of blue crabs. A study methods section providing detailed information on tagging and capture operations and on analysis methods. A results section that presents the major findings of the study. A discussion and conclusions section that interprets and discusses major findings and defines the impacts of power plant operations at Chalk Point on blue crab populations in the Patuxent estuary. A list of references are included.

PB81-144057 PC **A04**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
Analysis of Striped Bass Larval Feeding Habits in the Potomac Estuary: 1976-1977.
Final rept.,
T. T. Polgar, and P. A. Souza. Dec 80, 71p
PPSP-PRFP-80-6

The analyses in this report investigate the connections between striped bass larval feeding habits and zooplankton prey composition and abundance in 1976 and 1977. Inferences are drawn from the results on those aspects of feeding habits that might affect spatial-temporal larval distributions and survivals: food availability and preferences. The analyses indicate that the distributions of feeding and non-feeding larvae are spatially and temporally dependent only in the finfold stage, and that spatial and temporal interactions in feeding condition reflect the evolution of larval abundance distributions due to transport and differential mortality. The feeding conditions of yolksac larvae depend on their size (larger larvae feed), and therefore, on development. Multivariate, non-parametric tests of stomach contents versus zooplankton composition indicate that, on the whole, all larval stages select the same types and amounts of available prey (randomly with respect to zooplankton density and composition). Tests on particularly important prey taxa, adjusted for environmental zooplankton abundance, indicate a few feeding preferences by various larval stages. However, it is possible that higher resolution data on larval stomach contents and zooplankton, providing greater power in statistical tests, might reveal further feeding preferences.

PB81-144065 PC **A05**/MF **A01**
Maryland Univ., Solomons. Chesapeake Biological Lab.
Demersal Fish Food Habit Studies Near the Chalk Point Power Plant, Patuxent Estuary, Maryland - 1978-1979.
Final rept.,
J. A. Mihursky, M. Homer, P. W. Jones, R. Bradford, and J. M. Scoville. Mar 80, 98p PPSP-CP-80-12

This study, initiated in April, 1978, was designed to complement concurrent structural fish and benthic invertebrate community studies in the Patuxent Estuary with regard to the Chalk Point Power Plant operations. The objectives of this study were: To document food habits of the abundant demersal fish species in two areas of the Patuxent Estuary, one near the Chalk Point Power Plant and one at a downstream reference area; to determine if dietary differences exist between populations of fish in the two study areas; and to use the food habit data to provide a linkage between fish populations and communities and the benthic invertebrate communities of the two areas. This final report focuses on the first two objectives and provides data, and recommendations, for the third objective.

PB81-145740 PC **A06**/MF **A01**
Arizona State Univ., Tempe. Dept. of Zoology.
The Bald Eagle of the Southwest with Special Emphasis on the Breeding Population of Arizona.
Rept. for 1975-79,
Robert D. Ohmart, and Ronald J. Sell. 1980, 119p
Contract DI-14-06-300-2674

To quickly appraise the knowledge available on Bald Eagles (Haliaeetus leucocephalus) in the Southwest. The scope of this report is to publish all the information available in the literature, in unpublished reports, and from personal communications on Bald Eagles in the Southwest. The report consists of five parts: Part 1 - Strictly a factual report on all available knowledge of Southwest Bald Eagles. Part 2 - An incorporation of information from around the country and our own interpretations of the data. Part 3 - Site-by-site discussion of the population breeding in Arizona. Part 4 - Is a hypothesis section which deals with the possible origin of the Arizona breeding population. Also contained in this section is a discussion on the

possible insolation or overheating problem in nestling that need further research. Part 5 - Contains the citation of all literature used and the credentials of individuals providing personal communications.

PB81-147209 PC **A02**
California Univ., Santa Barbara.
Pigment Content and Photosynthetic Rate of the Fronds of 'Macrocystis pyrifera',
W. N. Wheeler. c1980, 8p NOAA-80110714
Grants NSF-GA-27484, NSF-ENG76-22720
Pub. in Marine Biology, v56 p97-102 1980.

The Macrocystis pyrifera (L.) C. Ag. frond is here described in terms of chlorophyll a, fucoxanthin, chlorophyll c and photosynthetic rate. Pigment concentrations increased back from the apical meristem reaching a maximum after 2 to 3 m. Pigment concentrations were then generally constant throughout most of the length of the frond, finally decreasing again in the oldest parts of the frond with the exception of the sporophylls. Pigment ratios remained relatively constant throughout. Maximum net photosynthetic rates on a given frond showed a decrease with tissue age on both an area basis and on a chlorophyll a basis, which was shown as half-saturation constants (quantum irradiance). Young sporophytes transplanted from the sea floor to the surface (12 m) tended to decrease pigment content, while those transplanted to the bottom tended to increase all pigments, but especially fucoxanthin. Photosynthetic rates, however, changed little on a unit area basis. The results of these data are considered in the light of recent work on photosynthetic units, tissue age effects and general adaptations of the M. pyrifera frond to its light environment.

PB81-147258 PC **A10**/MF **A01**
Arizona Game and Fish Dept., Kingman. Region III Office.
Fishery Investigation of Lake Mead, Arizona-Nevada, from Separation Rapids to Boulder Canyon, 1978-79.
Final rept.,
Terry C. McCall. 1980, 206p
Contract DI-8-07-30-X0025

This investigation was conducted to provide baseline fishery data for inclusion in future environmental impact statements on the lower Colorado River. The biology of each species collected is discussed including data from field observations and lab analyses.

PB81-148470 PC **A02**
California Univ., Santa Barbara.
Effect of Boundary Layer Transport on the Fixation of Carbon by the Giant Kelp 'Macrocystis pyrifera',
W. N. Wheeler. 25 Jan 80, 10p NOAA-80110713
Grants NSF-GA-27484, NSF-ENG76-22720
Pub. in Marine Biology, v56 p103-110 1980.

The uptake of inorganic carbon into the thallus of Macrocystis pyrifera (L.) C. Ag. requires first that the inorganic carbon pass through the water medium to the plant surface. This transfer of inorganic carbon to the thallus must take place through a boundary layer. Experiments in water tunnels indicate that the boundary layer adjacent to the M. pyrifera blade may be turbulent in water speeds as low as 1 cm per sec. Photosynthetic output of the blade can be increased by a factor of 300% by increasing water speeds over the blade surface from 0 to 4 cm per sec. This is consistent with a decrease in the thickness of the boundary layer. Above 4 cm per sec, the assimilation of carbon was limiting. The assimilation of carbon is generally known to follow Michaelis-Mentenlike kinetics. Combining the two uptake steps into an overall model of carbon uptake agrees well with photosynthetic data obtained from M. pyrifera under varying conditions of water speed and bicarbonate concentrations in the laboratory. The ecological and morphological consequences of these findings are discussed.

PB81-149494 PC **A06**/MF **A01**
Istituto de Ricerca sulle Acque, Rome (Italy).
Metodologia Standard di Saggio Algale per lo Studio della Contaminazione delle Acque Marine (Algal Bioassays Applied to the Study of Marine Coastal Waters for Descriptive and Previsional Purposes).
1978, 120p 39
Text in Italian. Summary in English. Also pub. as ISSN-0390-6329.

A marine algal bioassay for use in the European Communities countries was standardized. The bioassay, which on a general basis is quite similar to the 'Marine Algal Assay Procedure Bottle Test' of the U.S. Environmental Protection Agency issued in December 1974, is intended primarily for use in the following general situations: (1) assessment of receiving marine coastal water to determine coastal water to determine their nutrient status and sensitivity to change; (2) evaluation of materials, products and waste waters do determine their potential effects on algal growth in receiving waters.

PB81-149643 PC **A06**/MF **A01**
Missouri Water Resources Research Center, Rolla.
Penetration of Solar Radiation in Snow-Ice Covered Water Reservoirs: Winterkill.
Completion rept. Oct 78-Sep 80,
Alfred L. Crosbie, and Gary W. Davidson. 28 Nov 80, 118p W81-00979, OWRT-A-113-MO(1)
Contracts DI-14-34-0001-9027, DI-14-34-0001-0127

A snow-ice covered water reservoir is modeled by two absorbing-scattering planar layers. The scattering centers in the snow layer are assumed to be ice spheres, while the scattering centers in the ice layer are assumed to be spherical voids. The scattering characteristics of each layer are predicted by Mie theory. A Dirac-delta function approximation to the scattering phase function is introduced to simplify the analysis and account for strong forward scattering due to diffraction. An invariant imbedding solution technique is then used to solve the transport equation including multiple scattering for the penetration of solar radiation through the snow-ice layer. The results of this investigation should help predict winter-kill (the suffocation of aquatic animal life in the winter months).

PB81-149734 PC **A08**/MF **A01**
National Inst. for Environmental Studies, Yatabe (Japan).
A Morphological Study of Adults and Immature Stages of 20 Japanese Species of the Family Chironomidae (Diptera).
Research rept.,
Manabu Sasa. 1980, 154p R-7-79

This study was undertaken as part of the Special NIES Research Program 'Studies on Eutrophication of Land Water' and constitutes the fifth report on taxonomy and biology of Japanese chironomid midges compiled by the author and his colaborators. In the preceding papers by Sasa (1978a, b), accounts were given on the taxonomic status and descriptions of adults and immature stages of a very common and important species, Tokunagayusurika akamusi (Tokunaga), and on the comparative morphology of nine species of the genus Chironomus in Japan. In the present paper, description on 19 species of larvae and 20 species of pupae and adults which were frequently found in the study areas, are reported. The association between larvae and pupae as well as pupae and adults were based mostly on specimens individually reared in the laboratory.

PB81-802944 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Shark Behavior and Biology. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 135p
Supersedes PB80-803125, and NTIS/PS-78/1300.

The citations cover selected abstracts on the biology, ecology, and behavior of sharks. Topics include bioacoustics, locomotor responses, attractants, repellents, and biotelemetry. (This updated bibliography contains 130 citations, 15 of which are new entries to the previous edition.)

PB81-856072 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Dictyostelium Development. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 235p NERACIRLNT1334
Sponsored by National Technical Information Service, Springfield, VA.

The articles cited in this bibliography cover all aspects of growth and development of the dictyosteliaceae. Although other species are mentioned, a majority of the references deal with the slime mold dictyostelium discoideum. Areas covered include the morphogenesis, factors effecting aggragation / disaggregation and spore formation / germination, genetic + biochemical analysis, pseudoplasmodium migration, intercellular communications, as well as electron mocroscopic and cinematographic studies of dictyostelium sp.. (Contains 218 citations, fully indexed and including a table of contents.)

PB81-856106 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Microbial Diseases of Corn and Their Control. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 276p NERACIRLNT1344
Sponsored by National Technical Information Service, Springfield, VA.

The articles cited in this bibliography cover the various aspects of the diseases of maize. The control, pathology, development, treatment occurence, and causes of such corn diseases as root, stalk, leaf and corn rot, downey mildew, and stewart's disease are reported. Also covered is the breeding + selection of disease resistant strains of maize. (Contains 244 citations, fully indexed and including a table of contents.)

PB81-930400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Structural and Functional Aspects of Cell Membranes.
Cancergram CB06.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram includes studies that elucidate membrane structure, function and composition of normal and transformed cells. Abstracts include concerned investigations on biophysical and biochemical properties, adhesion and cell interaction, transport processes, receptor analysis and membrane probes. In general, abstracts describing tumor and other cell surface antigens (covered by Cancergram CB05) are excluded, unless information on the biochemical composition of these antigens is related to membrane structure.

PB81-931900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cytology: Techniques, Applications.
Cancergram CB21.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram focuses on the cytological techniques and methodologies employed in general experimental studies related to cancer research. The cytological technologies involved in preclinical, diagnostic, and therapeutic studies are also included. Specific areas of interest are microscopic and autoradiographic techniques, flow systems analysis, histochemistry and cytochemistry, and methodologies related to cytological instrumentation.

PB81-932100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cell Biology: Growth Regulation, Differentiation.
Cancergram CB16.

1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The scope of this Cancergram includes factors which have significant effects on growth and differentiation of normal and neoplastic cells in vivo and in vitro. The scope centers on the production, physical characteristics, and action of these growth regulatory factors in human and animal model systems. Emphasis is placed on factors which are endogenously produced, including chalones, prostaglandins, polyamines, and other serum and cellular factors; however, certain exogenous agents (such as nutritional factors, tumor promotors, and certain viruses) which have a principal effect on cell growth and differentiation are selectively covered. Of peripheral interest are studies involving agents that directly affect the production or function of growth factors. Papers on steroid hormones and cyclic nucleotides are included only if they relate to regulation of growth or differentiation. Other papers pertaining to the biology of steroid hormones and cyclic nucleotides appear in Cancergrams CB07 and CB14, respectively. The characterization and measurement of cell growth and cell replication are not within the scope of this Cancergram: these topics are covered by Cancergram CB09.

PB81-932600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Molecular Biology: RNA.
Cancergram CB26.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers the isolation, characterization, synthesis, modification, and degradation of RNA in normal and cancer cells. Characterization and measurement of cellular levels of heterogeneous nuclear RNA, messenger RNA, ribosomal RNA, and transfer RNA are of central interest. Studies of the mechanism and control enzymes involved in RNA metabolism are also included. The cellular process of translation is covered in Cancergram CB27. As the primary focus of this Cancergram is on cellular RNA, studies on viral nucleie acids are included only when they may illuminate aspects of cellular RNA metabolism. This and other cancer-related aspects of the RNA viruses are comprehensively covered in Cancergrams CB22 (Cell Biology and Animal Studies) and CB23 (Molecular Biology).

PB81-936500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Oncogenic Transformation.
Cancergram CK14.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers selected aspects of oncogenic transformation of cells by chemical, physical, and viral agents, and spontaneously occurring transformation; effects of transformation on cell proliferation and progression through the mitotic cycle; effects on cell morphology, cell metabolism, and other cellular biochemistry; effects on the structure, composition, and function of the cell surface and cell membrane; and studies of enhancement or prevention of transformation. Emphasis is placed on comparison between transformed and normal cells, and on the effects of transformation that may contribute to recognition of the process of oncogenesis or to the tumorigenic properties of the transformed cells. This Cancergram excludes studies of the composition, structure, and genetic character of virus particles or virus fragments, and studies of the occurrence, replication, recovery, and infectivity of viruses or virus fragments, except in cases where these studies relate in a highly specific way to transformation. The Cancergram also generally excludes in vivo studies relating to the progression of malignancy as revealed by histological studies.

6E. Clinical Medicine

AD-A094 151/8 PC **A21**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Annual Progress Report, Fiscal Year 1979.
Rept. for 1 Oct 78-30 Sep 79.
1 Oct 79, 494p

Contents: In-House Laboratory Independent Research (Six Projects); Defense Research Sciences, Army (Eleven Projects); Environmental Stress, Physical Fitness, and Medical Factors in Military Performance (Eleven Projects).

AD-A094 166/6 PC **A02**/MF **A01**
Naval Medical Research Unit No. 3, FPO New York 09527.
Reprint Accession List 1979. Number 9.
Jan 80, 17p

This volume of Scientific Publications List contains citations of 40 technical/scientific articles published by scientists associated with the U.S. Naval Medical Research Unit No. 3, Cairo, Egypt. These citations are listed by reprint number and cross-indexed by subject and author. (Author)

AD-A094 321/7 PC **A02**/MF **A01**
Naval Dental Research Inst, Great Lakes, IL.
Research Abstracts of 1980.
Dec 80, 16p Rept no. NDRI-PR-80-16

Contents: Criteria for the Assessment of Dental Pulp Health Beneath Deep Caries, Incidence of Dental Caries After Six Months Among a Sample of Naval Recruits, Fluoride Concentration in Plaque of Caries-Free and Caries-Active Naval Recruits, Histologic Assessment of Probing in the Presence of Periodontitis, Salivary pH-Rise Profiles of Oral Organisms in Relation to Caries Experience, An Evaluation of Porosity of Aluminum Oxide Implants, Inhibition of Treponema oralis by Surface Active Compounds, Glucan Synthesis by S. mutans from Caries-Active and Caries-Free Naval Recruits.

AD-A094 331/6 PC **A02**/MF **A01**
Naval Dental Research Inst, Great Lakes, IL.
Relationship between Dental Caries Experience and Surface Enamel Fluoride Concentration in Young Men from Three Optimally Fluoridated Cities.
Research progress rept.,
Harris J. Keene, James R. Mellberg, and Ernest D. Pederson. 13 Nov 79, 8p Rept no. NDRI-PR-80-17
Pub. in Jnl. of Dental Research, v59 n11 p1941-1945 Nov 80.

No abstract available.

AD-A094 332/4 PC **A02**/MF **A01**
Naval Dental Research Inst, Great Lakes, IL.
Streptococcus mutans and Dental Disease in the Navy.
Research progress rept.,
I. L. Shklair, B. L. Lamberts, G. E. Clark, and M. R. Wirthlin, Jr. Dec 80, 9p Rept no. NDRI-PR-80-19
Pub. in U.S. Navy Medicine, v71 n2 p28-32 Feb 80.

No abstract available.

AD-A094 333/2 PC **A02**/MF **A01**
Naval Dental Research Inst, Great Lakes, IL.
Cold Weather Dentistry: A Review.
Research progress rept.,
M. R. Wirthlin, Jr. Dec 80, 7p
Pub. in U.S. Navy Medicine, v71 n4 p12-15 Apr 80.

No abstract available.

AD-A094 352/2 PC **A02**/MF **A01**
Army Medical Research Inst. of Infectious Diseases, Frederick, MD.
Changes in Tissue Cyclic AMP Concentrations following an Intravenous Lethal Dose of Cholera Enterotoxin in Rabbits,
C. T. Liu, and E. J. Galloway. 13 Jan 81, 14p

The purpose of this study was to test the hypothesis that a generalized increase in tissue cAMP concentrations after an IV injection of cholera enterotoxin may play a role in the development of biochemical and pathological changes leading to death. Dutch rabbits allocated as control (n equals 9) and challenged (n equals 13) groups were injected IV with highly purified cholera enterotoxin at a dose of 100 or 200 micrograms/kg. When death appeared imminent (20-30 hr after inoculation), rabbits were anesthetized; plasma urine and 13 different tissue samples were obtained for cAMP determinations. When results from toxin-injection rabbits (100 micrograms/kg) were compared with those of controls, no significant changes were observed in any tissue studied. A higher dose of enterotoxin (200 micrograms/kg) produced significant increases in cAMP concentrations in lung, spinal cord, skeletal muscle, renal cortex, renal medulla and liver. The elevation of cAMP values in selected tissues suggests differences in tissue sensitivity to cholera enterotoxin; the data fail to support in toto the proposed hypothesis. (Author)

AD-A094 397/7 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A CO2 Laser System for Corneal Surgery.
Master's thesis,
William Harold Possel. Dec 80, 88p Rept no. AFIT/GEP/PH/80-6

A CO2 laser optical system capable of precise control of output power, beam divergence, and spot size was designed to investigate cutting properties of the focused laser beam on corneal tissue. The laser system was tested in three different modes of operation: continuous wave (CW), externally chopped, and Q-switched. The system was tested on bovine, hog, and human corneas. The results indicated that the CO2 laser can make corneal incisions with a controllable penetration depth of 10 micrometers and deeper and a width as small as 50 micrometers. With such accurate control, the laser may supplement and even replace the scalpel in some surgical procedures such as radial keratotomy, relaxing incisions following corneal transplants, and rapid and precise cutting of surface sutures. By integrating a CO2 laser system with a standard slit lamp, the ophthaimologist should have a safe and useful tool in laser surgery of the cornea. (Author)

AD-A094 445/4 PC **A02**/MF **A01**
Defence Research Establishment Suffield, Ralston (Alberta).
Protocol for the Meningococcal Control Programme - Canadian Forces Base Cornwallis and Canadian Forces Base St. Jean 1980/81,
L. A. White, and G. Humphreys. Nov 80, 18p
Rept no. DRES-MEMO-1008

Instructions are provided to the Laboratory and Preventive Medicine personnel of the Base Hospitals at CFB Cornwallis and CFB St. Jean to enable them to carry out sampling and treatments in accordance with the Surgeon-General's program on meningococcal control. Two programs, the Acute Case Monitoring Program and the Specialized and Intensive Monitoring program are described. Techniques for the collection of Neisseria meningitidis from the air, for cultivating and serogrouping this organism are presented.

AD-A094 519/6 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Dietary Induction of Renal Mineralization in Dogs,
Robert E. Schmidt, Gene B. Hubbard, Jasper L. Booker, and Chester A. Giesler. 28 Jan 80, 9p
Rept no. SAM-TR-79-372
Pub. in Canadian Jnl. of Comparative Medicine, v44 n4 p459-465 Oct 80.

No abstract available.

BNL-28573 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Application of Nuclear Microlocalization Techniques to Biomedical Problems.
H. W. Kraner, and K. W. Jones. Oct 80, 6p
CONF-801111-22
Contract AC02-76CH00016
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980.

Ion beams at the Brookhaven 3.5 MV Research Van de Graaff accelerator have been used for ele-

mental analysis and distribution in biomedical samples. Results from several collaborations are presented. Both collimated and uncollimated charged particle beams are used for elemental analysis by measurement of characteristic x-rays (PIXE). A collimated proton beam, using a pinhole collimator (approx. 20 mu m) has been used as a particle microprobe in the laboratory ambient. Thick, essentially unprepared, samples can be measured with general elemental sensitivities of < 10 ppM. The spatial resolution and elemental sensitivity have proven adequate for many samples of tissue secthons and cell clusters. Specimen damage by charged particle beams is discussed and results of cell irradiations by triton beams are presented. Deuterium localization has been carried out in cell uptake studies using the exp 2 H(exp 3 H,n) exp 4 He reaction initiated by the triton beam at the accelerator. Alpha particles from the reaction register the deuterium distribution in a plastic track detector. This technique suggests that exp 3 H may be replaced by the stable isotope exp 2 H in tracer studies. Studies have included the detection of nonexchangeable exp 2 H in oocytes and the uptake of deuterated thymidine in blood cells. (ERA citation 06:003952)

CRSSA-RA-1978 PC **A16**/MF **A01**
Centre de Recherches du Service de Sante des Armees, Clamart (France).
Centre de Recherches du Service de Sante des Armees. 1978 Scientific Works.
1979, 362p
In French.
U.S. Sales Only.

Three main themes of radiobiology emerged from this progress report. They are as follows: biological and chemical effects of external irradiation; the combined effects of irradiation and surgery, irradiation and burns; irradiation chemoprophylaxis (radioprotective substances) and irradiation chemotherapy. (Atomindex citation 11:532369)

FRNC-TH-864 PC **A09**/MF **A01**
Toulouse-3 Univ. (France).
Shielding in Electron BEAMS Used in Radiotherapy.
I. Sentenac. 1979, 189p
In French.Thesis.
U.S. Sales Only.

The interactions of electron beams with initial energies between 7 and 30 MeV have been studied in various materials including polystyrene, aluminium, copper and lead. The following experimental results have been found: estimation of measurement point displacement in a cylindrical chamber and of its variations with electron beam energy, empirical relations between the energy at the surface and the practical range of the electrons in various materials, an estimation of the relative ionization due to the 'bremsstrahlung' measured behind different materials with beam complete shielding. Improvement of electron beam collimation is suggested after analysis of the dose distribution behind partial shielding. (Atomindex citation 11:520078)

HRP-0900642/0 PC **A11**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. School of Hygiene and Public Health.
A Comparative Study of Team and Primary Nursing Care on Two Surgical Inpatient Units of a Teaching Hospital.
Final rept.,
John P. Young, Phyllis B. J. Giovannetti, and Dana Lewison. Jun 80, 229p
Contract PHS-HRA-232-78-0150

This is a report of the activities, findings, and recommendations of a project aimed at comparing team and primary nursing care on two surgical inpatient units in a short-term, acute-care hospital. Data were obtained in 1976 and 1979 that related to direct and indirect nursing care, patient satisfaction, job satisfaction, quality of care, and nursing costs. These data were analyzed to determine differences between the team and primary nursing organizational modes studied. The findings showed that, for the study units, primary nursing did not necessarily result in more direct patient care time, higher job satisfaction, higher patient satisfaction, higher quality of care, or lower personnel costs. Rather, what emerged was considerable evidence for the use of caution in the implementation of primary nursing as an organizational mode. Although primary nursing may be an ideal way in which to provide nursing care in one setting, it may prove less than effective in another. It became clear that operational modifications may be required in order to cope with a variety of factors that affect nurse staffing in specific care settings.

HRP-0900645/3 PC **A08**/MF **A01**
JWK International Corp., Annandale, VA.
Retrospective Longitudinal Study of the Full Utilization of Nursing Talent Program Graduates and Their Practice Settings - Final Report, Part I, Analysis of Funded Projects,
Teresita B. Hernandez, and Janine Pick. Oct 80, 155p
Contract PHS-HRA-232-78-0172
See also HRP-0900647.

This report presents findings from a study of projects to increase the number of disadvantaged and underrepresented persons entering the nursing profession. This effort assisted a broad spectrum of individuals, including financially or otherwise disadvantaged persons, men, licensed practical nurses, ethnic and racial minorities. The funded projects were located in geographic areas with a demonstrated need for additional nurses, and the assumption was made that persons recruited from these areas would remain or return to practice near their former homes. Another study objective was to examine various recruitment and retention methods tested by the projects. The purpose of such an investigation is to collect information that may be useful for future recruitment projects of a similar nature, i.e., programs to increase health career opportunities for individuals from disadvantaged backgrounds, and, more generally, programs to increase the availability of health manpower resources. This study attempts to answer such questions as: Did the Full Utilization program help individuals. Did it help change restrictive admissions policies. Did it help foster commitment to the recruitment and retention of disadvantaged and underrepresented groups in those institutions that were federally funded. Part I is a systematic analysis and case-by-case review of all documentation available on each funded project. Part II is a survey of individuals who were recruited and assisted in completing a nursing educational program through the funded activities. The Project Summaries present the purpose, scope of work, and outcomes of each contract funded.

HRP-0900647/9 PC **A05**/MF **A01**
JWK International Corp., Annandale, VA.
Retrospective Longitudinal Study of the Full Utilization of Nursing Talent Program Graduates and Their Practice Settings - Final Report, Project Summaries,
Teresita B. Hernandez, and Janine Pick. Oct 80, 96p
Contract PHS-HRA-232-78-0172
See also HRP-0900645 and HRP-0900646.

This report presents 25 project summaries of contracts awarded under the Full Utilization of Education Talent for the Nursing Profession between 1968 and 1974. Information provided includes Project Title, Contractor, Funding Period, and Amount of Funding. The project summaries present the purpose, scope of work, and outcomes of each contract funded. Four major types of organizations were awarded recruitment contracts; namely, universities, local councils, leagues and corporations, State and regional educational agencies, and national nurses' associations. Contracts to develop nursing education programs were awarded mainly to educational institutions. Outcomes provide data in terms of populations contacted, ethnic and racial groups recruited, placed, graduated, materials produced, and impact of the efforts. Part I is a systematic analysis and case-by-case review of all documentation available on each funded project. Part II is a survey of individuals who were recruited and assisted in completing a nursing educational program through the funded activities. The Project Summaries present the purpose, scope of work, and outcomes of each contract funded.

HRP-0902617/0 PC **A06**/MF **A01**
American Academy of Physicians' Assistants, Arlington, VA.
Development of a Self-Assessment Examination for Physician Assistants,
Donald W. Fisher, and Ayres D'Costa. Aug 79, 125p DHHS/PUB/HRA-80-38
Contract PHS-HRA-231-76-0053
Prepared in cooperation with Ohio State Univ., Columbus.

The purpose of this project was to develop a criterion-referenced self-assessment examination for physician assistants (PAs), using the Role Delineation as the basis, from which appropriate continuing education packages could be developed. The test development effort was undertaken with the help of Working Committees consisting of PAs and PA educators. A six-hour examination consisting of 315 items has been constructed using two try-outs. The domain of the examination is the competency skills and knowledge expected of an entry-level generalist PA. The domain has been defined in terms of two sets of scales: 17 Role Scales and 28 Body System Scales. The interpretation of scores is based upon minimum competency scores decided upon by expert judgement using the Nedelsky Technique.

HRP-0902624/6 PC **A06**/MF **A01**
Missouri Center for Health Statistics, Jefferson City.
Missouri Vital Statistics, 1979.
1980, 123p PUB-4.20

This report presents the final tabulation of statistical data relating to vital events in Missouri during 1979. Data for the year of the report was accepted through March 15, 1980, allowing information reflecting events in 1979 to be as complete as possible. Missouri Vital Statistics 1979 is published for use in public health and related fields as an aid for studying births, deaths, fetal deaths, marriages, dissolutions, and abortions. Provisional vital statistics data are available through the publication, Missouri Monthly Vital Statistics. Unpublished detailed annual vital statistics data are available upon request.

HRP-0902634/5 PC **A05**/MF **A01**
Wisconsin Dept. of Health and Social Services, Madison. Div. of Policy and Budget.
Nursing Home: Cost/Quality Study.
Final rept.,
Gail Krc, Sherwood Seigel, and Tim Tyson. Sep 80, 83p

The purpose of this study is to explore the extent to which Medicaid reimbursement affects the quality of care provided to residents in Wisconsin nursing homes. In order to carry-out this objective, the study also attempted to determine if the 'quality' of nursing home care can be adequately assessed with data collected from applying H32, the State's administrative code for nursing homes and the only statewide source of information on conditions in Wisconsin nursing homes. The study was primarly motivated by the need to ensure that Medicaid expenditures are justified given the quality of care actually being provided to the residents of Wisconsin nursing homes. Nursing home industry representatives often claim that Medicaid (which is the principal source of payment for almost 70 percent of the residents in Wisconsin nursing homes) does not reimburse them enough to meet Wisconsin's high standards of patient care. But while it is known that the level of Medicaid reimbursement varies by as much as 100 percent; it is not known if homes which have higher rates also offer better care.

HRP-0902635/2 PC **A07**/MF **A01**
Bureau of Health Manpower, Hyattsville, MD.
Trends in BHM Program Statistics Grants, Awards, Loans - FY 1957-78.
Feb 80, 136p DHEW/PUB/HRA-80-26

This publication, initiated in 1970, provides summary trend data on Health Manpower Education and Training programs of the Bureau of Health Manpower (BHM), formerly the Bureau of Health Resources Development. These data, in addition to being used by management for program planning and evaluation purposes, have been helpful to regional office personnel in their negotiations

with institutions desiring to participate in the BHM programs. They have also been valuable as a complement to the annual BHM publication, 'Directory of Grants, Awards, and Loans'. The publication includes information on awards made during fiscal years 1957 to 1978. Note: In tables reflecting data by fiscal year, 'TQ' refers to the transition quarter, July 1 to September 30, 1976. The BHM is the focal agency within the federal government for the support of education and training programs to meet the nation's health manpower requirements in medicine, osteopathic medicine, dentistry, optometry, pharmacy, podiatric medicine, veterinary medicine, nursing, allied health, and public health. The Bureau administers programs for construction, institutional support, special projects, student loans and scholarships, research projects, research training, research career development, traineeships, fellowships, and contracts.

HRP-0902636/0 PC **A13**/MF **A01**
Medicus Systems Corp., Washington, DC.
An Empirical Model for Measuring Nursing Productivity in Acute Care Hospitals.
Final rept.,
Lyman C. Dennis, II, Marsha G. Dunn, and Gerard C. Benson. 31 Jul 80, 287p
Contract PHS-HRA-231-77-0121

The purpose of this project is to develop an empirical model of nursing productivity in acute care hospital settings. The successful development of a model representing significant interrelationships between measurable variables that influence nursing productivity is of considerable importance to nurses as well as those in associated disciplines. The project involved the execution of the fllowing key tasks: The translation of a theoretical framework of nursing productivity into one quantitatively measurable; The selection of independent variables hypothesized to influence nursing productivity; The development of data collection instruments and procedures and their application; and The formulation, testing and validation of a model to assess nursing productivity.

HRP-0902638/6 PC **A02**/MF **A01**
West Michigan Health Systems Agency, Grand Rapids.
Alcohol Abuse Treatment Services Planning: A Study and Guidelines.
Oct 80, 23p STUDY-80-18
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

These guidelines for alcohol abuse treatment services planning provide a beginning base for planning and future development of alcohol abuse services. Estimates of need for service are figured through the Marden formula. Projections of service capability required to meet estimated needs for service are calculated using available service utilization, length of treatment, and other program data. Alcohol abuse treatment services in three major categories are addressed in these guidelines: outpatient services, residential services, and inpatient services. Residential services have been further divided into 4 functional categories: subacute detoxification, intermediate care, day-care, and half-way house. Guidelines are offered on the appropriate distribution of levels of service, accessibility, efficiency, and effectiveness. There are measurements and a dated review criterion provided for some of the guidelines. There are 5 guidelines concerning need; 4 on the relationship to a network of services; 1 on community impact; 4 on financial and economic impact; and 1 related to evaluation. Tables and references are included.

HRP-0902640/2 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Financial, Legal and Administrative Problems Associated with Bed Reduction,
Hallett L. Hall. 29 Oct 80, 12p TECHNICAL ASSISTANCE MEMO-72
Contract PHS-HRA-232-79-0037

As mandated by the Michigan Public Health Code (Public Act 368), the Governor appointed a task force of affected parties to examine problems associated with a reduction in excess hospital capacity. The task force recommended the creation of a private, nonprofit corporation to set up and administer a state fund for defraying bed reduction costs incurred by hospitals. The corporation would work with third-party payors regarding reimbursement for capacity reduction costs. Such costs include payment of current liabilities, satisfaction of long-term debt service requirements, professional liability costs, hospital employee obligations, and 'front-end' costs incurred in the early stages of a capacity reduction initiative. The corporation would also assure that placement and retraining services are provided for displaced employees and that a program is available to assist displaced physicians. Activity on state and Federal levels is recommended to minimize exposure to antitrust liability for participants in the capacity reduction program. The task force's report, issued in December 1979, has been approved by the Governor, who has appointed a special committee to implement its recommendations. This paper consists of remarks made at a conference on capacity planning and implementation sponsored by the Western Center for Health Planning in April 1980.

HRP-0902644/4 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Trends and Types of Multi-Hospital Arrangements. Part I,
David B. Starkweather. Nov 80, 13p TECHNICAL ASSISTANCE MEMO-56
Sponsored in part by Bureau of Health Planning, Hyattsville, MD. Prepared in cooperation with California Univ., Berkeley. School of Public Health.

The first memo of a two-part series describes several types of multi-hospital combinations and ranks them on a pluralism-fusion scale. The one extreme, pluralism, involves no formal relationships whatsoever between two or more hospitals. The other extreme is complete fusion. Starting with pluralism and moving toward fusion, the following types of combinations can be found. 'Affiliations' are combinations among institutions designed for specific and limited joint undertakings, entered into voluntarily and formally but containing easily executed escape clauses for each party. 'Management contracting' is the arrangement of hospitals sharing administrations, often lasting for several years and retaining the cooperating members as distinct legal and operational entities. In the 'umbrella corporation' arrangement, a new corporation is formed which spans but does not replace prior entities and is basically considered permanent. A 'merger' or 'consolidation' is a combination of previously separate entities in which at least one organization is dissolved and absorbed by another or by a new corporation. In consolidations, a new corporation completely replaces the prior corporate entities, while in merger the controlling corporation is one of the prior existing entities. There is also a great variety of informal arrangements which either enhance or mitigate the establishment of formal relationships. This series is based upon a presentation at the Western Center's Conference 'Hospital Sharing, Consolidations and Mergers' (May 1979). Figures and tables are included.

HRP-0902645/1 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
The Pros and Cons of Multi-Hospital Systems,
David B. Starkweather. Nov 80, 15p TECHNICAL ASSISTANCE MEMO-57
Contract PHS-HRA-232-79-0037
Prepared in cooperation with California Univ., Berkeley. School of Public Health.

This second memo of a two-part series on multi-hospital arrangements addresses the potential benefits and consequences of such arrangements to the participating institutions and to the local health system. A background discussion on multi-institutional integration is given. The challenge for planning agencies is to match the right kind of multi-institutional arrangement to individual community or regional circumstances. Suggestions on how to address this challenge are made. Fifteen considerations to address in multi-hospital arrangements are discussed: length of time; efficiency; the real conseuqences of shared services; building trust or maintaining distrust; impact on quality; impact of reorganization on health care delivery; impact of multi-regional integration on local health-care delivery; equity; factors that enable merger; who makes the decisions; hospitals as coalitions; the effect of mergers on the balance of power; organizational stress; post-merger instability; and potential for organizational renewal. This series is based upon a presentation at the Western Center's Conference 'Hospital Sharing, Consolidations and Mergers' (May 1979).

HRP-0902646/9 PC **A02**/MF **A01**
Western Center for Health Planning, San Francisco, CA.
Planning for Energy Development,
Ralph Gildroy. 30 Oct 80, 10p TECHNICAL ASSISTANCE MEMO-59
Contract PHS-HRA-232-79-0037

Given that the health of the boom town's residents would be affected by the inadequacy of its entire infrastructure (i.e., roads, housing, water supply, waste removal system, school system, and health services), the need for Health Systems Agency (HSA) involvement in energy impacted areas (areas targeted for energy development) throughout the western region is obvious. HSAs, however, lack the resources required to establish an information network with the organizations affecting the decisions concerning where and when energy projects will be undertaken. The concerns prompted the formation of the Intermountain Consortium for Energy (ICE) made up of 11 HSA executive directors and are reflected in the following ICE objectives: identify and share information about energy impacted areas prior to their development; plan for interagency, interstate, intraregional delivery of secondary and tertiary care service related to energy development; identify and share information about health services implementation strategies applicable to remote communities; and promote HSAs as resources for all levels of government as well as business and labor groups. These remarks, presented at the May 8-9, 1980, Western Center for Health Planning conference on energy and health also touched on the health implications of new energy technologies, specific health and social problems energy impacted communities face, and a translation of various energy units into a common frame of reference.

HRP-0902648/5 PC **A03**/MF **A01**
Comprehensive Health Planning Council of Southeastern Michigan, Inc., Detroit.
Project Review Criteria and Standards for Open Heart Surgery Services in Southeastern Michigan.
17 Sep 80, 35p
Grant PHS-05-P-000235-05

Developed to provide guidelines for section 1122 and certificate of need reviews, these criteria and standards provide the basis for the review of proposals to establish, expand, or alter adult and pediatric open heart surgery services as required under the Michigan Public Health Code (Public Act 368). The criteria and standards are grouped into seven categories: demonstrated community need (2 criteria, 7 standards); ability to staff and operate (1, 7); physical design (1, 5); quality of care (1, 7); financial issues (1, 4); economic issues (1, 5); and board composition (1, 2). Most standards include quantifiable indicators and each category has a discussion providing a brief rationale for the criteria and standards. References are included for nine documents that were used extensively in drafting the criteria and standards. Appendices include extracts of pertinent legislation and the authority and procedures for the formulation of criteria and standards.

HRP-0902649/3 PC **A03**/MF **A01**
Comprehensive Health Planning Council of Southeastern Michigan, Inc., Detroit.
Project Review Criteria and Standards for Rehabilitation Services in Southeastern Michigan.
17 Sep 80, 50p
Grant PHS-05-P-000235-05

Developed to provide guidelines for section 1122 and certificate of need reviews and to provide guidance to prospective providers of rehabilitation services, these criteria and standards address the provision of services in a variety of inpatient and outpatient settings. The criteria and standards are grouped into seven categories: demonstrated community need (3 criteria, 20 standards); ability to staff and operate (1, 9); physical design (1, 7); quality of care (5, 10); financial issues (2, 7); eco-

nomic issues (1, 4); and other organizational issues (2, 4). Some of the standards include quantifiable indicators and several elements. The documents used in the formulation of the criteria and standards are cited in the text and in footnotes. Appendices give the authority and procedures for formulation of criteria and standards; Federal definitions of, and conditions for, participation for clinics, rehabilitation agencies, and public health agencies; and Medicare definitions of comprehensive outpatient rehabilitation services.

HRP-0902652/7 PC **A02**/MF **A01**
California State Univ., Chico.
Cost-Effectiveness of a Restrictive Drug Formulary Louisiana Versus Texas,
Dennis L. Hefner. 1 May 80, 21p
Sponsored in part by National Pharmaceutical Council, Inc., Washington, DC.

Governors, legislators, and Medicaid administrators, faced with the challenge of stretching limited budgets to meet increasing needs, implement various fiscal and administrative strategies. Because Medicaid programs are generally managed on a service area basis, fiscal strategies many times are confined to a specific benefit category, such as hospitalization or pharmaceutical services. However, if access to one form of care is reduced or eliminated, the reduction in treatment options may cause an increased demand for the remaining services. This study provides a further test for validating the findings of the previous longitudinal study. Medical utilization in two comparison states-Louisiana and Texas-are examined for differing utilization patterns. The primary objective is to determine whether the changes in expenditures and frequency of diagnoses which occurred in Louisiana following implementation of the restrictive drug formulary were unique to that state's program or typified a general trend within Medicaid populations. If the former case is true, it would further support the major policy implication derived from the initial evaluation of the Louisiana Medicaid drug formulary.

HRP-0902653/5 PC **A02**/MF **A01**
Rhode Island Dept. of Health, Providence.
Rhode Island's Health 1980.
1980, 24p
Prepared in cooperation with Rhode Island Health Services Research, Inc., Providence.

As required by Section 42-62-22 of the General Laws of 1956, as amended, this document is the fifth annual report on the health conditions and health expenditures of the people of Rhode Island. The report was produced from Rhode Island's comprehensive health data base. This data base was developed cooperatively by both public and private agencies and is organized by Rhode Island Health Services Research, Inc. (SEARCH).

HRP-0902654/3 PC **A02**/MF **A01**
Institute for Health Planning, Inc., Madison, WI.
The Statewide Health Coordinating Council: Roles and Relationships.
Jul 80, 19p
Contract PHS-HRA-232-79-0036

One of the major structural elements for health planning required to be established under Title XV of the Public Health Service Act is the Statewide Health Coordinating Council (SHCC). This document reviews the history of the SHCC concept and the functions of this state-level citizen body. The major activities expected to be undertaken by a SHCC are reviewed, as are options for its organization and committee structure. The importance of developing written procedural guidance is stressed, and an outline of the content of such guidance provided.

HRP-0902659/2 PC **A07**/MF **A01**
Health Resources Administration, Hyattsville, MD. Office of Health Resources Opportunity.
Health of the Disadvantaged, Chart Book-II.
Sep 80, 148p DHHS/PUB/HRA-80-633

The Office of Health Resources Opportunity (OHRO) was established in the Health Resources Administration in 1973 and is that part of the Agency which focuses on these imbalances from the perspective of the disadvantaged. This chart book attempts to further OHRO's goal by integrating into one convenient resource book published, as well as previously unpublished data, on the health status of the disadvantaged. Undoubtedly, some worthy sources have been omitted. Hopefully the highlighting of some key facts on the sociodemographic characteristics of minorities and the poor, their health status and needs, their utilization of health services and participation in health programs will encourage further approaches toward achieving equity.

HRP-0902661/8 PC **A03**/MF **A01**
Indiana Health Careers, Inc., Indianapolis.
Indiana Expanded MEDIHC Effort Allied Health Manpower Distribution Program.
Final rept. 13 Sep 79-12 Sep 80,
Janis L. Davidson. 1980, 28p
Contract PHS-HRA-232-79-0049

Indiana Health Careers has operated the Expanded MEDIHC Effort Allied Health Manpower Distribution Program in Indiana. The services were provided and performed statewide. The objective was to continue the Expanded MEDIHC program and assess the effectiveness of its efforts to correct the maldistribution of allied health personnel in Indiana. The recruitment of Veterans was given priority and they were referred to vacancies in the health care delivery system or to education/training or to both. Advocacy services were extended to veterans by both project staff and Indiana Health Career's staff.

HRP-0902663/4 PC **A23**/MF **A01**
American Physical Therapy Association, Washington, DC.
Role Delineation Refinement and Verification - the Comprehensive Report.
Final rept. 1 Oct 78-31 Jul 80,
Gary L. Garrett. 1980, 542p
Contract PHS-HRA-232-78-0201

This report contains the results of the exploratory research conducted by the American Physical Therapy Association. This research involved physical therapist and physical therapist assistant role delineation refinement and verification, entry-level role determinations, and translation of these roles into an examination development protocol and examination blueprint specifications. The report presents the Association's survey approach and analysis plan, including the use of multivariate analysis techniques and a balance of expert judgment with empirical data for selecting entry-level roles. It also presents the validation of the entry-level decisions through data analyses, the entry-level physical therapist and physical therapist assistant competencies in the format published in Competencies in Physical Therapy: An Analysis of Practice (1), and issues and recommendations related to conducting the research.

HRP-0902664/2 PC **A08**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Health Systems Plan for 1980. Health Service Area 4 Oklahoma. 3rd Edition.
Jan 80, 151p
Grant PHS-06-P-00161-04
See also HRP-0902665 and HRP-0902666.

This HSP is designed as a statement of goals and objectives describing a healthful environment and health systems which, when developed, will assure that quality health services will be available and accessible in a manner which assures acceptability and continuity of care at a reasonable cost, for all Oklahomans.

HRP-0902665/9 PC **A04**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Annual Implementation Plan for 1980. Health Service Area 4 Oklahoma.
Jan 80, 61p
Grant PHS-06-P-000161-03
See also HRP-0902664 and HRP-0902666.

This volume contains the Annual Implementation Plan for health in Oklahoma. The purpose of this plan is to outline what activities need to occur within the next 12 months in order to accomplish the Long Range Objectives outlined in the Health Systems Plan.

HRP-0902666/7 PC **A05**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Health Systems Plan for 1980. Health Service Area 4 Oklahoma. Executive Summary.
Jan 80, 91p
Grant PHS-06-P-000161-03
See also HRP-0902665 and HRP-0902664.

The Plan for Health in Oklahoma is the first comprehensive plan to be developed by Oklahoma Health Systems Agency's members and staff. The plan includes an assessment of the present status of health of the citizens and of the health care delivery system in Oklahoma. It also sets goals for the future, and suggests ways for achieving the stated goals and objectives.

HRP-0902668/3 PC **A03**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Facilities and Services Task Force Report. Chapter XIV: Maternity Services.
Jan 80, 48p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Maternity care within the hospital setting includes all services related to the care of the pregnant woman and the child she carries prior to and during delivery. Services related to the care of newborns will be discussed in the following chapter. The primary objective of quality maternity care is the optimum outcome of pregnancy for the individuals involved in the birth event. While the focus of this report is upon standards and criteria for obstetrical services provided within health care facilities, it should be made clear from the onset that comprehensive maternity care plans eventually must emphasize wellness and health promotion prior to the birth event, the early detection of complications, as well as mechanisms for referral and post-natal follow-up.

HRP-0902669/1 PC **A02**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Facilities and Services Task Force Report. Chapter XIII: Pediatric Inpatient Services.
Jan 80, 18p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

While the needs of a pediatric service, within a facility, are comparable to those for adults, special consideration must be given to adaptations and special arrangements to accommodate the needs peculiar to children, where feasible. It is recognized that those needs involve space segregated from adult patients, access to family, special equipment and qualified pediatric staff. Another need which differentiates pediatrics from adult care is a need for an integrated set of services involving social services, preventive services and curative services.

HRP-0902671/7 PC **A03**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Facilities and Services Task Force Report. Chapter XV: Open Heart Surgery and Cardiac Catheterization Services.
Jan 80, 31p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Since every part of the body relies on adequate supplies of blood pumped by the heart through the blood vessels, even a small reduction of the flow can be disastrous for the remainder of the body, through some organs are more sensitive than others. In the developed countries of the world, diseases of the heart and vessels kill more people than does anything else. There are basically two categories of heart disease which can be corrected by what is known as Open Heart Surgery. They are congenital abnormalities of the heart (conditions that are present at birth) and acquired heart disease (produced by influences outside the victim). Congenital heart conditions frequently involve valvular disorders; such conditions may or may not require surgery. If they do, it may be performed on the infant at the time it is first detected, or later on in youth or adulthood, as needed. Acquired heart disease is the form receiving most at-

tention in Open Heart Surgery. The most common Open Heart Surgery procedures is known as a coronary vein-bypass.

HRP-0902672/5 PC **A03**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Facilities and Services Task Force Draft Report. Chapter XII: Radiation Therapy Services.
Sep 79, 33p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Radiation Therapy is a clinical medical speciality in which patients with cancer and other tumors or neoplasms are treated with ionizing radiation. Ionizing radiation penetrates cells and deposits energy within them. This form of energy, when it is sufficiently intense, kills cells by inhibiting their division. The objective of treatment is to deliver a lethal dose of radiation to cancer cells with minimal damage to surrounding, healthy tissues. While all tissues are affected by radiation, cancer cells often are more susceptible to radiation's damaging effects. This difference in responsiveness to radiation is one of the basic reasons why radiation therapy is an effective cancer treatment. The majority of all cancer patients will require radiation therapy at some time during the course of their disease.

HRP-0902673/3 PC **A02**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Facilities and Services Task Force Report. Chapter X: End-Stage Renal Disease Services.
Jan 80, 25p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

It is estimated that there are between 50,000 and 60,000 deaths related to some form of kidney disease each year in the United States. Kidney transplantation and dialysis are accepted methods for treating end-stage renal disease. Transplantation and dialysis are interdependent therapies. Should a transplant recipient reject his graft, he may be sustained on dialysis until the performance of a second or third transplant. Conversely, a long-term dialysis patient may have a transplant at any time during his course of treatment. Prior to the early 1960's treatment that could sustain the end-stage renal disease patient was not available and the fate for such patients was inevitable. Now almost 90% of ESRD patients receiving maintenance dialysis or a renal transplant survive each year.

HRP-0902674/1 PC **A03**/MF **A01**
Oklahoma Health Systems Agency, Inc., Oklahoma City.
Facilities and Services Task Force Report. Chapter XI: Computed Axial Tomographic Scanning Services.
Jan 80, 34p
Sponsored in part by Bureau of Health Planning, Hyattsville, MD.

Computed axial tomography, or CAT, is a diagnostic imaging technique that shows cross sectional images of internal body structures. The SCAT Scanning machine works by sending an x-ray beam through a cross-sectional layer of the body or the brain. The x-ray pictures that emerge are absorbed in a detector. Differences in the amount of absorption indicate differences in tissue density. The differences in tissue density are important, because tumors and other abnormalities have different densities than surrounding normal tissues. Through this process organs and lesions previously hidden from conventional x-rays can be seen.

HRP-0902677/4 PC **A03**/MF **A01**
Tennessee Dept. of Public Health, Nashville.
Induced Abortions Reported in Tennessee 1978.
Jul 80, 49p

In response to the Vital Records Act of 1977, the Tennessee Department of Public Health prepared the Report of Induced Termination of Pregnancy. The use of this report form was initiated January 1, 1978. The new report form, which was designed according to recommendations from the National Center for Health Statistics, continued the system for reporting induced terminations of pregnancy performed in Tennessee. The data collected from both the original and the revised forms serve as a basic resource for surveillance of the State's abortions and for health professionals in making decisions on the design and provision of abortion and family planning services. The data procured from the Reports of Induced Termination of Pregnancy are valuable at both the state and national level in studying the effects of induced abortions on maternal and child health and on fertility patterns.

HRP-0902678/2 PC **A03**/MF **A01**
Health Systems Agency of North Central Connecticut, Hartford.
Decision-Making through an Open Process: The Development of Hospital Planning Standards in North Central Connecticut,
Robert Yass, John Bihldorff, Raymond Borst, Edward Fox, and William Hart. 1960, 46p
Grant PHS-01-P-000072-04

The Health Systems Agency of North Central Connecticut completed a comprehensive review and analysis of the National Guidelines for Health Planning in December, 1979. A subcommittee of ten individuals, formed by the Plan Development Committee, systematically examined the national standards for each acute care service with the objective to recommend adoption or modification of the standards to best reflect the needs and conditions of the region.

HRP-0902680/8 PC **A17**/MF **A01**
Analysis, Management and Planning, Inc., Cambridge, MA.
A Compendium of Standards and Criteria for Project Review. Volume II.
30 Jul 79, 378p
Contract PHS-HRA-232-78-0080
See also Volume 3, HRP-0902681.

There are at least two major important uses for this compendium. First, at the national level, the criteria and standards contained in this compendium can be used to: (1) provide guidance in the further development of national goals and standards; (2) identify areas where research efforts must be focused in order to develop criteria and standards needed in the field; (3) determine areas where national data collection strategies may be developed in order to enhance the quality of the criteria and standards used in the field; and (4) guide the design of a national monitoring and evaluation effort that focuses on important performance characteristics of the health system. Second, at the State and local level, the criteria and standards contained in this compendium can provide guidance to the planning agencies in their efforts to develop better criteria and standards for their own planning and project review efforts.

HRP-0902681/6 PC **A99**/MF **A01**
Analysis, Management and Planning, Inc., Cambridge, MA.
A Compendium of Standards and Criteria for Project Review. Volume III.
30 Jul 79, 782p
Contract PHS-HRA-232-78-0080
See also Volume 2, HRP-0902680.

The purpose of this compendium of criteria and standards, which is presented in three separate volumes, is to describe the existing state-of-the-art of available health services criteria and standards. In compiling the information contained in this compendium, documents were reviewed from over one-hundred health planning agencies across the country, as well as papers and reports on criteria and standards that represent both published and unpublished findings. Selecting those criteria and standards from among the many presented in these documents, papers and reports was no easy task for most, if not all, of the criteria and standards contained in these materials exhibited some merits. However, selection was necessary in order to present only those criteria and standards that were either quantitative, or sufficiently qualitative to provide more objective guidance in their utilization as measurable evaluation tools.

HRP-0902682/4 PC **A04**/MF **A01**
Analysis, Management and Planning, Inc., Cambridge, MA.
Evaluation of Criteria Being Used in Conducting Project Reviews by HSAs and SHPDAs. Final Report.
30 Nov 79, 66p
Contract PHS-HRA-232-78-0080
See also Executive Summary, HRP-0902683.

The purpose of this study was to evaluate the development, adoption and use of project review criteria by Health Systems Agencies (HSAs) and State Health Planning and Development Agencies (SHPDAs). The National Health Planning and Resources Development Act of 1974, Public Law 93-641, called for the establishment of HSAs and SHPDAs across the country. Among the many purposes for establishing these planning agencies are: (1) to achieve equal access to quality health care at a reasonable cost, through (2) the development of rational health plans to provide direction on what changes in the health system are needed, and (3) to ensure that some of these changes are made by regulating what changes actually take place in the system.

HRP-0902683/2 PC **A03**/MF **A01**
Analysis, Management and Planning, Inc., Cambridge, MA.
Evaluation of Criteria Being Used in Conducting Project Reviews by HSAs and SHPDAs. Executive Summary.
30 Nov 79, 28p
Contract PHS-HRA-232-78-0080
See also Final Report, HRP-0902682.

The purpose of this study was to evaluate the development, adoption and use of project review criteria by Health Systems Agencies (HSAs) and State Health Planning and Development Agencies (SHPDAs). As more and more of these health planning agencies are becoming fully designated and becoming more focused on plan implementation, the role of project review criteria and standards is becoming increasingly important, as the criteria play a critical role in the health planning agency decision-making process. Over recent years, there has been a growing concern that existing criteria is not adequate for HSAs and SHPDAs to accomplish their goals, nor to justify many of the crucial decisions reached regarding the delivery of health services.

IAEA-R-1702-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Evaluation of Automatic/Computerized Thermoluminescence Dosimetry Systems for the Therapy Level X-Ray and Cobalt-60 Intercomparison. Final Report for the Period 1 November 1975-30 September 1979.
K. Duftschmidt. Jan 80, 11p
U.S. Sales Only.

The method derived using two experimental dosimeter cards and six reference cards exposed in a dosimeter holder can be used to determine the absorbed dose in the range of 160 - 240 rad within an absolute uncertainty of less than +-4%. (Atomindex citation 11:532135)

IAEA-R-1749-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Calcium Metabolism in Fluorosis and Endemic Genu Valgum Using Radioactive Tracer, Whole Body Counting and Radioimmunoassay. Final Report for the Period 15 December 1975-14 December 1978.
B. Narasinga Rao. Nov 79, 23p
U.S. Sales Only.

Endemic fluorosis with extensive skeletal changes has been reported from several parts of India. In recent years a new condition, endemic genu valgum, has been recognized in one of these areas. In both conditions osteosclerosis, particularly of the spine, has been observed, but in genu valgum the most distinctive pathology is osteoporosis in bones of the extremities and presumably as a result the "knock knees" that give the syndrome its name. In this project certain aspects of calcium metabolism were investigated in endemic fluorosis and genu valgum and in appropriate control subjects. Calcium kinetics were studied by intravenously injecting a tracer dose of exp 47 Ca and following for 10 days thereafter the concentration

of the tracer in serum and excreta, as well as its total retention in the body (the latter measured by whole body counting). In addition calcium balance was measured on some of the subjects while resident in a metabolic ward. Statistical analysis of the results showed in general a higher metabolic activity of calcium in the fluorosis and genu valgum cases than in the controls (specifically, higher "turnover" of calcium in the blood pool and an apparently elevated bone mineralization rate). Whole body retention was somewhat greater in the patients than in the controls. Several measurements were also performed relative to blood chemistry, and in particular the serum concentration of 25-OHD sub 3 (a metabolite of vitamin D) was measured. There was no evidence that vitamin D deficiency played a significant role in the causation of genu valgum. (Atomindex citation 11:531650)

IAEA-R-1828-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Complete Study on the Etiology of Malign Renal Lithiasis Based on the Determination of Other Hormones and Functional and Metabolic Parameters Implied in These Diseases. Part of a Coordinated Programme on in Vitro Assay Techniques. Final Report for the Period 1 October 1977 - 30 November 1979.
P. Tiberiu. Oct 79, 18p
U.S. Sales Only.

Plasma parathyroid hormone (PTH) and plasma calcitonin (CT) were measured by radioimmunoassay with commercial radioimmunoassay kits and corresponding biochemical and functional studies were carried out in 55 patients with unilateral or bilateral malignant lithiasis and in a group of 10 control subjects. Plasma PTH levels were found to be normal in 5 of the patients and slightly or markedly elevated in 50, whilst plasma CT levels were found to be normal in 52 and slightly elevated in 3. In a further analysis of the data, plasma PTH levels were found to be slightly elevated in 42 out of the 45 patients suffering from renal failure and markedly elevated in 3. The latter were suspected of primary hyperparathyroidism, but in none was any adenoma discovered, either scintigraphically or by other means. It is concluded that secondary reactive hyperparathyroidism may appear in malignant renal lithiasis, but that primary hyperparathyroidism is unlikely to be implicated in the recurrent nature of the disease, which is more likely to result from residual calculi. The significance of these findings in relation to the management of the disease is discussed. (Atomindex citation 11:531317)

IAEA-R-1895-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
In Vitro Radioassay Techniques in the Study of Reproductive Hormones. Final Report for the Period 1 January 1976-30 November 1979.
M. Rivarola. Jan 80, 10p
U.S. Sales Only.

Testosterone (T) levels in the testicular tissue in varicocele were studied in relation to alterations of testicular function. Testicular T levels were measured by a modified radioimmunoassay procedure in which exp 3 H-testosterone was used as a tracer to monitor losses during extraction of the hormone. Serum follicle stimulating hormone (FSH), luteinizing hormone (LH) and T levels were measured by conventional radioimmunoassay. Testicular function was evaluated from patient histories and physical examinations, and from the results of sperm counts and histological examinations of biopsy specimens. In 4 control patients mean testicular T was 520 +- 127 ng/g tissue and the mean ratio testicular T/serum T 104 +- 47. In the majority of 17 patients with unilateral varicocele, testicular T was within normal limits, but in 3 patients with severe testicular damage values of 2700, 2373 and 1437 ng/g were recorded. Serum T levels were normal in the majority of patients and decreased in 2. Serum FSH levels were normal in the majority of patients and increased in 3. Serum LH levels were increased in approximately one half of patients. The results are considered indicative of impaired Leydig cell function in varicocele. It appears, however, that decreased T production is compensated by increased LH production and that the germinal cells are not deprived of T. (Atomindex citation 11:531657)

IAEA-R-2296-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
24-Hour Profiles of Thyrotropin, Thyroxine and Triiodothyronine in Goitrous and Goitre-Free Ugandans. Final Report for the Period 1 December 1977 - 30 November 1979.
S. K. Kajubi. Jan 80, 7p
U.S. Sales Only.

Plasma thyrotropin (TSH), thyroxine (T4) and triiodothyronine (T3) concentrations were measured by radioimmunoassay with commercial assay kits in serial blood samples collected over a 24-hour period from 6 normal and 6 clinically euthyroid but goitrous male Ugandan subjects. Measurements on normal subjects revealed two peaks in plasma TSH concentration, one at about 08.00 hrs, the other at about 20.00 hrs. Plasma T4 concentrations showed two corresponding peaks, while plasma T3 concentrations showed no discernable pattern. Measurement on goitrous subjects revealed only the earlier peak in plasma TSH concentration, while the pooled mean TSH concentration was lower than in normal subjects. Plasma T4 concentrations showed two peaks, as for normal subjects, but the pooled mean T4 concentration was also lower than in normal subjects. Measurements on plasma T3 concentration again showed no discernable pattern. The significance of these findings is discussed. (Atomindex citation 11:531310)

INIS-mf-5749 PC **A15**/MF **A01**
Ministerstvo Zdravookhraneniya SSSR, Moscow.
Summaries of Reports of 4. All-Union Congress of Roentgenologists and Radiologists. Summaries of Reports.
1979, 346p CONF-7906182-(Sum.)
All-union congress of roentgenologists and radiologists, Ul'yanovsk, USSR, 5 Jun 1979.
U.S. Sales Only.

Summaries of papers in the subject area of radiodiagnosis are presented. Items within the scope of EDB are entered individually. (Atomindex citation 11:529713)

PATENT-4 239 749 Not available NTIS
Department of Health and Human Services, Washington, DC.
'Neisseria gonorrhoeae' Vaccine.
Patent,
Thomas M. Buchanan. Filed 27 Sep 79, patented 16 Dec 80, 4p PB81-152696, PAT-APPL-6-079 556
Supersedes PB80-168958.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a vaccine affording protection against infection by Neisseria gonorrhoeae (N.g.) microorganisms is prepared from principal outer protein material isolated from gonococci.

PATENT-4 241 187 Not available NTIS
Department of Health and Human Services, Washington, DC.
Method and Apparatus for Cell and Tissue Culture.
Patent,
David C. White. Filed 27 Mar 79, patented 23 Dec 80, 7p PB81-152753, PAT-APPL-6-024 247
Supersedes PB-296 769.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a method and apparatus for culturing biological cells and tissues in high density are disclosed, employing perfused blood as the nutrient source. The cells or tissues are separated from the perfused blood by means of a microporous membrane which is maintained in close contact with the cells or tissues, and which is permeable to plasma solutes and to cell products and impermeable to blood cellular components, where by continuous diffusion of plasma solutes and cell products takes place between the perfused blood and the cells or tissues through the microporous membrane while maintaining the cells or tissues separated from the cellular components of the blood.

PB81-134827 PC **A06**/MF **A01**
Arizona Univ., Tucson.
Adult Day Health Care - A Conference Report.
Final rept. 30 Jun 76-30 Jun 79,
Brahna Trager. May 79, 107p NCHSR-80-59
Contract PHS-HS-02580

The National Center for Health Services Research awarded a Conference Grant to the Department of Public Administration of the University of Arizona to conduct a National Conference on Adult Day Care. The Conference provided a forum for discussion and debate on the present state of knowledge and future directions that should be taken. Participating in the dialogue were a selected group of researchers, practitioners and policy makers actively involved with or concerned about this newly emerging alternative in long-term care.

PB81-135402 PC **A03**/MF **A01**
State Univ. of New York at Stony Brook.
The Market for Non-Physician Hospital Personnel: Executive Summary and Final Report (Revised).
Research rept. 30 Sep 77-29 Sep 79,
Richard Dusansky. Jun 80, 38p NCHSR-81-30
Grant PHS-HS-02787

An econometric study of demand for, supply of and substitution among registered and licensed practical nurses is carried out using state aggregated data for the United States. Equations for stocks, labor force participation rates and wages of the nurses are estimated in a simultaneous equation system using three-stage least squares. The impact of licensure laws is also investigated.

PB81-139651 PC **A08**/MF **A01**
Tufts Univ., Boston, MA. School of Dental Medicine.
Development and Evaluation of a Diagnostic System for the Early Detection of Dental Caries.
Final rept. 1 Apr 77-31 Mar 80,
George E. White, Anthi Tsamtsouris, and David L. Williams. 20 Jun 80, 158p NIDR/CR-81-01
Contract N01-DE-52476
Prepared in cooperation with Abcor, Inc./BIOTECK, Inc., Wilmington, MA.

An instrument was developed which measures the resistance of occlusal sites, printing values up to 30 megohms and buzzing below 5 megohms. Drying air passes continually through the instrument probe tip. In a longitudinal study, two examiners used instrument and conventional (explorer, tactile, and visual) techniques on pediatric patients at six-month intervals. The instrument data correlated well with the explorer. Clinically sound, decalcified, and carious teeth had 65, 1.5, 0.3% of resistance values over 30 megohms, respectively; 31, 61, 17% between 5 and 30 megohms; and 4.4, 38, 82% under 5 megohms. For longitudinal comparisons, the explorer criteria appeared to change with time. The instrument consistently found about 10% of the sites to be below 5 megohms; whereas the conventional (explorer) criteria initially found 5% to be positive, and this rose to 20% later in the study. The instrument agreed with the later positive explorer findings (12 and 18 months later) better than the earlier explorer diagnosis agreed with these later explorer findings. Also, after 12 and 18 months the early instrument reading was a better predictor of restorations. Interproximal caries were measurable, provided the instrument tip could contact the carious area. In a preliminary study, APF treatment was shown to initally decrease (1 hour) and later increase (1 day, 1 week) enamel resistance. In in vitro studies the precision of resistance measurements was about plus or minus 25%. Several seconds are needed to reach an equilibrium value on carious sites. Using an electrometer, in vitro measurements on smooth surfaces were used to evaluate the effect of enamel thickness, decalcification, and fluoridation procedures. Lactate buffer significantly decreased enamel resistance. Both NaF and APF treatments of decalcified sections significantly increased the enamel resistance. Enamel near the surface is less permeable than that nearer the dentinal junction.

PB81-141640 PC **A13**/MF **A01**
Young (Arthur) and Co., Washington, DC.

Economic Impact Analysis of Proposed Identification and Notification Rule on Friable Asbestos Containing Materials in Schools. Proposed Rule, Section 6 Toxic Substances Control Act.
Final rept.,
Susan Wright, Stephen Schoepke, and Philip Mathias. Sep 80, 294p EPA-560/12-80-004
Contract EPA-68-01-3930

This study examines the economic impact of the detection and notification of schools which have areas contaminated with friable asbestos-containing materials. The problem is identified by geographic area and by square footage of asbestos-containing materials per school. Unit costs are examined by region for inspection and analysis of samples by X-ray diffraction, electron microscopy, and optical microscopy. The total impacts of Asbestos Schools Rule No. 1 are also presented and discussed.

PB81-141657 PC **A06**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Support Document for Proposed Rule on Friable Asbestos-Containing Materials in School Buildings. Health Effects and Magnitude of Exposure. Proposed Rule, Section 6 Toxic Substances Control Act,
Charles Poole, and Harry Teitelbaum. Oct 80, 123p EPA-560/12-80-003

The Agency has determined that exposure to asbestos in school buildings poses a significant hazard to public health. Exposure to asbestos fibers can lead to serious and irreversible diseases. Friable asbestos-containing materials release ashestos fibers into the ambient environment. A sizeable proportion of schools contain asbestos-containing materials. In certain conditions these materials release fibers in concentrations which pose increased risks of developing the disease.

PB81-144602 PC **A07**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper Number 1: Methodological Issues and Literature Review.
Sep 80, 140p OTA-BP-H-5
See also report dated Aug 80, PB80-216864, and Paper no. 3, PB81-144610. Library of Congress catalog card no. 80-600160.

This paper is one of five background papers which supplement the OTA report, The Implications of Cost-Effectiveness Analysis of Medical Technology (PB80-216864). It focuses primarily on the question, what is the technical, or methodological, validity of cost-effectiveness analysis (CEA) and cost-benefit analysis (CBA) when used to assess certain types of medical technologies within certain settings. It critically examines the methods of CEA and CBA and reviews the literature on both types of analysis in health care. This report contains an extensive bibliography on CEA/CBA.

PB81-144610 PC **A06**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper Number 3: The Efficacy and Cost Effectiveness of Psychotherapy.
Oct 80, 104p OTA-BP-H-6
See also report dated Aug 80, PB80-216864, Paper no. 1, PB81-144602, and Paper no. 4, PB81-144628. Library of Congress catalog card no. 80-600161.

This case study assesses methodological and substantive issues relating to the scope of psychotherapy, the evaluation of psychotherapeutic efficacy, and the applicability of CEA/CBA in assessing psychotherapy. It was prepared in response to a request from the Senate Finance Committee. The report discusses four issues centrally related to the evaluation of psychotherapy: (1) the definition and complexity of psychotherapy; (2) the degree to which psychotherapy is amenable to scientific analysis and the availability of appropriate methods for studying psychotherapy; (3) the evidence as to psychotherapy's efficacy, including the results of analyses that synthesize findings across studies; and (4) the appropriateness of CEA/CBAs of psychotherapy and the results of their application.

PB81-144628 PC **A11**/MF **A01**
Office of Technology Assessment, Washington, DC.
The Implications of Cost-Effectiveness Analysis of Medical Technology. Background Paper Number 4: The Management of Health Care Technology in Ten Countries.
Oct 80, 233p OTA-BP-H-7
See also report dated Aug 80, PB80-216864, and Paper no. 3, PB81-144610. Library of Congress catalog card no. 80-600162.

This paper is primarily an analysis of the policies, programs, and methods, including cost-effectiveness and cost-benefit techniquess, that nine industralized nations other than the United States use to manage the effects of medical technology. The experience of these nine countries in managing medical technology is compared to that of the United States. The countries discussed are: the United States, the United Kingdom, Canada, Australia, Japan, France, Germany, Netherlands, Iceland, and Sweden. Whenever possible, the authors included data on five specific medical technologies: the computed tomography scanner, renal dialysis, coronary bypass surgery, cobalt therapy, and automated clinical laboratory services.

PB81-144826 PC **A05**/MF **A01**
Social Security Administration, Washington, DC. Office of Research and Statistics.
Personal Health Care Expenditures by State. Volume II. Public and Private Funds 1966 and 1969,
Barbara S. Cooper, Nancy L. Worthington, and Paula A. Piro. 1975, 85p DHEW/PUB/SSA-75-11906

This report presents State estimates of total personal health care spending by source of funds and type of expenditure. Analysis of total expenditures in 1969 is presented in terms of the types of services purchased, the source of financing, and demographic State variables. Spending in 1969 is compared with that of 1966--the year before Medicare amd Medicaid began operations--in order to explore the impact of these programs on the financing of health and the variation of this impact by State.

PB81-145112 PC **A06**/MF **A01**
Applied Management Sciences, Inc., Silver Spring, MD.
A Synthesis of Research Studies on Hospital Productivity. Volume I: Bibliography, Classification of the Literature, and Annotated Bibliography.
Executive summary (Final) 30 Sep 79-30 Apr 80, Robert T. Deane, John L. Ashby, Kathryn M. Langwell, Stanley C. Wisniewksi, and Kwai-fong Chui. 30 Apr 80, 107p G-150.1, NCHSR-81-31
Contract PHS-233-79-3001
See also Volume 2, PB81-145120.

The objective of this study was to provide health planners and policymakers with an overall assessment of the state-of-the-art in hospital productivity measurement for use in health planning at the regional level. A thorough literature search of economics, health administration, and management sciences sources was conducted. In addition, data sources and productivity monitoring systems were examined to determine data availability for current and future studies. A comprehensive review of the literature was prepared and the conclusions reached were that, currently, quantitative measures of productivity were available and suitable for use by health planners. However, it would be useful, in this area, to conduct additional research on health status impacts of hospital services and on patient satisfaction.

PB81-145120 PC **A05**/MF **A01**
Applied Management Sciences, Inc., Silver Spring, MD.
A Synthesis of Research Studies on Hospital Productivity. Volume II: Synopsis of the Literature, and Summary of Selected Data Bases and Productivity Monitoring Systems.
Final rept. 30 Sep 79-30 Apr 80,
Robert T. Deane, John L. Ashby, Kathryn M. Langwell, Stanley C. Wisniewski, and Kwai-fong Chui. 30 Apr 80, 93p G-150.1, NCHSR-81-32
Contract PHS-233-79-3001
See also Volume 1, PB81-145112.

The primary objective of this project is to provide health planners and policymakers with an overall assessment of the current state-of-the-art on the measurement of hospital productivity. The accomplishment of this objective has required an analysis, summary, comparison, and synthesis of existing research on hospital productivity and measurement, as well as classification of hospital productivity measures in a context useful for health policymaking and planning.

PB81-145229 PC **A05**/MF **A01**
Social Security Administration, Washington, DC. Office of Research and Statistics.
Comparison of Cost and Benefit Incidence of Government Medical Care Programs, Fiscal Years 1966 and 1969.
Staff paper,
Barbara S. Cooper, and Nancy L. Worthington. Sep 74, 98p DHEW/PUB/SSA-75-11852, RS-STAFF PAPER-18
See also HRP-0007313.

This report examines the mechanisms used for the current government health programs in terms of who ultimately pays for these programs and who receives their benefits. Data are presented and analyzed by State with particular emphasis on the impact of the programs according to the income level of the States.

PB81-145419 PC **A03**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hospital Ancillary Services.
Executive summary 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 28p NCHSR-81-21
Contract PHS-HS-00236

The objective of this study was to expedite the flow of patients through the hospital by finding new methods for scheduling essential services. The grantee studied the interaction of the factors that arrest patient flow such as admission policies, bed allocation and operating room capability. A mathematical model of the problem was constructed and tested. Findings: A set of decision rules have been evolved that assist hospital administrators in scheduling the use of hospital services in such a way that the effective capacity of the hospital is increased. Widespread adoption of this method would significantly reduce the number of hospital beds required in the Nation, reduce hospital stay, and contain costs.

PB81-145625 PC **A04**/MF **A01**
Social Security Administration, Washington, DC. Office of Research and Statistics.
Medicare: Health Insurance for the Aged, 1972, Section 1.1 Reimbursement by State and County.
Annual series rept. for 1972.
1975, 62p DHEW/PUB/SSA-75-11704

For each State and county and for groups of metropolitan and nonmetropolitan counties, this report provides figures on the number of persons enrolled under Medicare as of July 1, 1972 and the amounts reimbursed during calendar year 1972 to, or on behalf of these insured. The presentation of these data is further subdivided into the two types of coverage available under the program--hospital insurance and supplementary medical insurance.

PB81-145633 PC **A04**/MF **A01**
Social Security Administration, Washington, DC. Office of Research and Statistics.
Medicare: Health Insurance for the Aged, Selected State Data, Fiscal Years 1968-1972,
Alma W. McMillan. 1974, 59p DHEW/PUB/SSA-74-11711
See also HRP-0027085.

This report presents data on enrollment, amounts reimbursed, the providers of services, as well as some utilization figures for hospitals and SNF for FYs 1968-1972.

PB81-147720 PC **A11**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hospital Ancillary Services: Part II, Appendix I, A Simulator-Based Planning Model for Hospital Microscopy Laboratories.
Final rept. 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 227p NCHSR-81-23
Grant PHS-HS-00236

This study is concerned with the Clinical Microscopy subsystem of The Mount Sinai Hospital of the City of New York. It is one of a series of studies dealing with the Optimum Utilization of Hospital Ancillary Services, supported by the National Institutes of Health, Public Health Service. During the several years that this series has been in effect, a succession of analytic investigations has been undertaken. The principal objective has been to insure that the human and equipment resources comprising hospital ancillary services are used to their fullest effectiveness, by applying operations research techniques to the problem of improving departmental performance.

PB81-147738 PC **A15**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hospital Ancillary Services: Part III, Appendix II, Hospital Blood Banking: An Evaluation of Inventory Control Policies.
Final rept. 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 348p NCHSR-81-24
Grant PHS-HS-00236

This study is concerned with the Blood Banking subsystem of The Mount Sinai Hospital of the City of New York. It is one of a series of studies dealing with the Optimum Utilization of Hospital Ancillary Services, supported by the National Institutes of Health, Public Health Service. During the several years that this series has been in effect, a succession of analytic investigations has been undertaken. The principal objective has been to insure that the human and equipment resources comprising hospital ancillary services are used to their fullest effectiveness, by applying operations research techniques to the problem of improving departmental performance.

PB81-147746 PC **A04**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hosptial Ancillary Services: Part IV, Appendix III, Simulation-Based Scheduling Model for Radiology.
Final rept. 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 63p NCHSR-81-25
Grant PHS-HS-00236

This appendix consists of three sections: a detailed description of the GPSS/360 radiology simulator program; a detailed set of GPSS flow charts containing the program logic (Major pages of logic in the charts are lettered in correspondence with the major sections outlined in the master flow charts in order to assist the reader in following the program sequencing); the remainder of the report comprises the program listing and sample output.

PB81-147753 PC **A05**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hospital Ancillary Services: Part V, Appendix IV, Total Hospital System Model.
Final rept. 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 77p NCHSR-81-26
Grant PHS-HS-00236

The purpose of this section of the report is threefold. First, to present a detailed technical description of the GPSS simulator which reproduces the major activities of the total hospital system. Secondly, to present a carefully erected set of flow charts in order to indicate the computer program's summarization of hospital activities. And finally, to discuss the actual GPSS computer program.

PB81-147761 PC **A04**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hospital Ancillary Services: Part VIII, Appendix VII, Determination of Transfers for Misplaced Patients: An Analytical Optimization Procedure.
Final rept. 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 57p NCHSR-81-29
Grant PHS-HS-00236
Portions of this document are not fully legible.

The objective of this study was to expedite the flow of patients through the hospital by finding new methods for scheduling essential services. The grantee studied the interaction of the factors that arrest patient flow such as admission policies, bed allocation and operating room capability. A mathematical model of the problem was constructed and tested. Findings: A set of decision rules have been evolved that assist hospital administrators in scheduling the use of hospital services in such a way that the effective capacity of the hospital is increased. Widespread adoption of this method would significantly reduce the number of hospital beds required in the Nation, reduce hospital stay, and contain costs.

PB81-147779 PC **A11**/MF **A01**
Mount Sinai School of Medicine, New York.
Optimum Utilization of Hospital Ancillary Services: Part I.
Final rept. 1 Jun 68-31 Dec 76,
David Valinsky, M. Barry Dumas, and Manus Rabinowitz. Oct 80, 226p NCHSR-81-22
Grant PHS-HS-00236

The objective of this study was to expedite the flow of patients through the hospital by finding new methods for scheduling essential services. The grantee studied the interaction of the factors that arrest patient flow such as admission policies, bed allocation and operating room capability. A mathematical model of the problem was constructed and tested. Findings: A set of decision rules have been evolved that assist hospital administrators in scheduling the use of hospital services in such a way that the effective capacity of the hospital is increased. Widespread adoption of this method would significantly reduce the number of hospital beds required in the Nation, reduce hospital stay, and contain costs.

PB81-149148 PC **A05**/MF **A01**
Chinese Medical Association, Beijing.
Chinese Medical Journal. Volume 93, Number 12, December 1980.
Dec 80, 82p

No abstract available.

PB81-802167 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vaccines and Immunity. December, 1977-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 77-Dec 80.
Jan 81, 192p
Supersedes PB80-801806, and NTIS/PS-78/1238. See also 1964-November, 1977, NTIS/PS-78/1237.

The citations include research on the clinical and laboratory evaluations of vaccines and studies on mechanisms of immune responses to infectious agents. (This updated bibliography contains 204 citations, 76 of which are new entries to the previous edition.)

PB81-802175 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Lung Cancer. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 204p
Supersedes PB80-801814, and NTIS/PS-78/1230.

The bibliography cites research on the etiology, diagnosis, pathology, and therapy of pulmonary neoplasms. Studies are also included on neoplasms of other respiratory organs. Occupational related carcinogenesis is discussed. (This updated bibliography contains 197 citations, 29 of which are new entries to the previous edition.)

PB81-856395 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radiotherapy. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 157p NERACEDBNT2504
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning radiation implants and external beam irradiation as sources for radiotherapy. Implant methods, radiation sources and radiation monitoring are detailed. New devices for implanting and monitoring are described. (Contains 144 citations, fully indexed and including a table of contents.)

PB81-856437 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Immunoglobin D. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 145p NERACIRLNT2640
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the nature and function of immunoglobin d (igd) in man and other animals. The molecular forms, relationship to b lymphocytes, relationship to various diseases and methods for isolation and quantitation are described. Igd myeloma is discussed in some detail. (Contains 131 citations, fully indexed and including a table of contents.)

PB81-856445 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Heart Transplants: Imunological Aspects. January, 1978-January, 1978 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Jan 78.
Dec 80, 117p NERACIRLNT2642
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning allograft rejections due to immune responses. Pretreatment proceeds by irradiation and various drug strategies are discussed. Suppression of direct and indirect cellular toxicity, the role of t lymphocytes as well as other immunological mechanisms are outlined. (Contains 103 citations, fully indexed and including a table of contents.)

PB81-856452 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Colostrum: Immunological Aspects. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 146p NERACIRLNT2645
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the transmission of passive immunity to neonates by colostrum. Discussion includes factors relating the absorption rate, the duration of the antibodies, the role of t-lymphocytes in maternal cell-mediated immunity and interferon and leukocytes activity. Assay methods are also discussed. (Contains 132 citations, fully indexed and including a table of contents.)

PB81-856643 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Infectious Mononucleosis Immunological Aspects. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 143p NERACIRLNT2625
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the immunolgy of infectious mononu-

closis, an acute febrile disease of children and young adults. T lymphocytes, t cell medicated immunity, b lymphocytes and epstein-barr virus relationship to the heterophile antibody is discussed. The viruses causing atypical mononucleosis are cited. Some unusual cases are described. (Contains 126 citations, fully indexed and including a table of contents.)

PB81-856650 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Experimental Allergic Encephalomyelitis. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 105p NERACIRLNT2643
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning experimental allergic encephalomyelitis (eae), an induced disorder which ellictes an autoimmune response to myelin basic protein which causes neural tissue destruction. These citations discuss the role of lymphocytes, the possible role of histocompatibility loci and the means to decrease the severity or prevent the disorder. The use of EAE as model to study the mechanisms of human demyelinating diseases such as m.s. is also discussed. (Contains 92 citations, fully indexed and including a table of contents.)

PB81-856668 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Graft Versus Host Reactions. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 148p NERACIRLNT2646
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the mechanism of graft vs. host reaction and the factors which effect it. These factors include histocompatability antigens, immunosuppression by irradiation and/or immunosuppressive drugs, T lymphocytes, B lymphocytes and macrophages. This bibliography has citations dealing with animal and human studies. (Contains 126 citations, fully indexed and including a table of contents.)

PB81-857070 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Corynebacterium Parvum Cancer Immunotherapy. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 187p NERACIRLNT2647
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the use of heat-killed corynebacterium parvum for non-specific immunotherapy. Both human and small animal studies are cited. The results have been equivocal. Its effect has been attributed to T-lymphocytes, macrophages, granulocytes and also the production of heat. (Contains 162 citations, fully indexed and including a table of contents.)

PB81-857195 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Immunity to Trypanosomiasis. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 211p NERACIRLNT2768
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the immunity to trypanosomiasis using animal models to elucidate the mechanisms. Discussed are cell-mediated and humoral immunity as well as the role of polymorphonuclear leukocytes and macrophages. (Contains 183 citations, fully indexed and including a table of contents.)

PB81-857203 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Immunity to Malaria. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 198p NERACIRLNT2769
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning immunity to malaria which is both cell-mediated and humoral, people in the hyperendemic areas of the world become increasingly resistant to malaria during childhood through the development of acquired immunity to the asexual blood stages of the parasite. This bibliography concentrates on the research being done to develop a vaccine to malaria. (Contains 179 citations, fully indexed and including a table of contents.)

PB81-857211 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Immunity to Mycobacteria. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 217p NERACIRLNT2770
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the immune response to the mycobacteria. The primary organisms discussed are mycobacterium lepae and mycobacterium tuberculosis. The primary areas colnered are cell-mediated and humoral immunity, phagocytosis and hypersensitivity. BCG is extensively discussed. (Contains 187 citations, fully indexed and including a table of contents.)

PB81-857229 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Transfer Factor. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 159p NERACIRLNT2772
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning a dialysable transfer factor derived from leukocytes which causes a non-specific stimulation of cell-mediated immunity. Transfer factor has been used experimently on many disease entities with varying results. (Contains 151 citations, fully indexed and including a table of contents.)

PB81-857237 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Myasthenia Gravis Immunological Aspects. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 187p NERACIRLNT2773
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning myasthenia (mg), an autoimmune disease characterized by muscle fatigability. gravis (mg), an autoimmune disease characterized by muscle fatigability. The etiology is not completely understood, however. Circulating antibodies to acetylcholine receptors at the neuro muscular junction help to explain the altered neuromuscular transmissions. Plasmapheresis is cited as means to relieve symptoms. The relationship of hla to mg is now being studied. (Contains 190 citations, fully indexed and including a table of contents.)

PB81-857245 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Psoriasis Immunological Aspects. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 123p NERACIRLNT2776
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning psoriasis and its immunological aspects. It is a complex proliferative disease of the epidermis whose underlying cause is still poorly defined. The defective functions are related to t-lymphocytes as well as the formation of stratum corneum antigen- antibody complexes. Hla antigens are being investigated. (Contains 127 citations, fully indexed and including a table of contents.)

PB81-857252 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Immunity to Fungal Infection. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 242p NERACIRLNT2779
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the humoral and cell-mediated immunity to fungal infections. These include complement, leukokines, lymphocytes, immunoglobulins, heat-labile psonins, polymorphonuclear leukocytes and macrophages. (Contains 216 citations, fully indexed and including a table of contents.)

PB81-857260 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Diabetes Mellitus and the HLA Antigens. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 83p NERACIRLNT2826
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the relationship between hla antigens and insulin dependent diabetes mellitus (iddm). Family and population studies have found statistically significant increased frequencies of the hla b-8, b-15, dw-3 and dw-4 alleles in iddm. The d locus related alleles, dw-3 and dw-4 association with iddm is stronger than the b-alleles. The hla alleles have a strong association with juvenile onset, insulin dependant, diabetes. (Contains 79 citations, fully indexed and including a table of contents.)

PB81-857278 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Slow Virus Diseases. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 164p NERACIRLNT2827
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the cause of the slow degenerative diseases of the central nervous system. Many viruses are discussed with particular emphasis on the measles virus, the proposed mechanisms of the diseases, including viral cytolysis and immunological deficency are discussed. Multiple scerlosis and creutzfeldt-takob disease of man are citted as well as many diseases of animals. (Contains 176 citations, fully indexed and including a table of contents.)

PB81-857484 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Analysis in Dosimetry. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Jan 81, 185p NERACUSGNT2106
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning computer programs that have been developed to calculate the population dose or individual dose of radioactivity. Many different programs are outlined and in many cases the computer pro-

grams are included along with samples of the output data. (Contains 165 citations, fully indexed and including a table of contents.)

PB81-857492 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computer Analysis in Dosimetry. January, 1970-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 70-Nov 80.
Jan 81, 242p NERACEDBNT2106
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning computer programs designed to calculate radiation dose equivalents, dose rates, dose distribution and accumulated internal radiation dosage. The models described are primarily related to radiation therapy and environmental radiation safety. Many programs are discussed in detail. These include mathematical models for calculating radionucleotide migration, radioecological concentration and radiotheraphy dose distribution. (Contains 216 citations, fully indexed and including a table of contents.)

PB81-857641 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Scintiscanning Radiocolloids. January, 1970-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 70-Nov 80.
Jan 81, 172p NERACEDBNT2619
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the use of radiocolloids for scintiscanning. This technique is used as an aid in the diagnosis of disease. The bibliography discussed many different radiocolloids in use and the target organs that these colloids scan. Comparisons between methods of scanning are also included. (Contains 176 citations, fully indexed and including a table of contents.)

PB81-857674 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lymphocyte Receptors for Complement. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 76p NERACIRLNT2777
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning complement receptors of lymphocytes. The bibliography discusses the methods used to determine the presence or absence of complement receptors and its significance. (Contains 57 citations, fully indexed and including a table of contents.)

PB81-857815 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Eosinophilia. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 98p NERACIRLNT2912
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning eosinophilia. These citations concentrate on hypereosinophilia related to allergic disorders (including drug reactions), parasitic infestation and infection. (Contains 95 citations, fully indexed and including a table of contents.)

PB81-857823 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Levamisole: Immunotherapy. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 99p NERACIRLNT2915
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning levamisole, a broad spectrum anthelmintic. It appears to act as an immunostimulant, enhancing granulocytic activity, humoral and cell medicated immunity and as such acting as beneficial therapy for many immunosuppressive and autoimmune diseases. Side effects of treatment are also discussed. (Contains 91 citations, fully indexed and including a table of contents.)

PB81-857831 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Basophils. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 158p NERACIRLNT2916
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the basophilic leukocyte. Theses citations discuss the nature of the IgE mediated release of histamine from the basophil and immediate-type hypersensitivity. The basophil degranulation test for the diagnosis of allergy is discussed and its features are compared to the older RAST. (Contains 134 citations, fully indexed and including a table of contents.)

PB81-857849 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Down's Syndrome. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 65p NERACIRLNT2917
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning chromosome anomalies and Down's Syndrome. The chromosomal aberrations that cause Down's Syndrome are discussed in detail. Various national studies and some unusual case studies are discussed. The role of maternal and paternal age is being reevaluated. (Contains 64 citations, fully indexed and including a table of contents.)

PB81-857856 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Wilms' Tumor. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 78p NERACIRLNT2942
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning Wilm's tumor, the second most frequent malignant disease in children. The prognosis depends upon the stage of the tumor; therefore, early diagnosis is critical. This bibliography discusses diagnosis, treatment and the complications resulting from treatment. Specific case histories are cited. (Contains 74 citations, fully indexed and including a table of contents.)

PB81-857864 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Amniocentesis. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Jan 81, 100p NERACIRLNT2943
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning amniocentesis, a procedure which provides for the prenatal diagnosis of chromosomal abnormalities and many in-born errors of metabolism. Many of the available tests are discussed. These include karotyping for chromosomal abnormalities such as Down's Syndrome and many of the biochemical tests available to detect the 'at risk' pregnancies. The risks involved in amniocentesis are also discussed. (Contains 112 citations, fully indexed and including a table of contents.)

PB81-929200 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Complete Set of Current Cancer Research Listings.
Special listings.
1981, approx. 84 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Single copies also available in paper or microfiche.

The subscription of current cancer research projects is a service of the International Cancer Research Data Bank (ICRDB) Program of the National Cancer Institute. It is comprised of listings describing ongoing projects in one selected cancer research area. The descriptions are provided by cancer scientists in about 50 different countries. The purpose of these listings is to facilitate and promote cooperation and exchange of information between cancer scientists by keeping them aware of ongoing projects related to their research in other laboratories throughout the world. The subscription offers a complete set of current cancer research listings. The subscriber will receive approximately 60 different topics each year dealing with the following areas of cancer research: Preclinical of cancer therapy; Clinical cancer diagnosis and therapy; Carcinogenesis - spectific types of cancer; Other carcinogenesis studies; Cancer virology; Cancer immunology; and Other cancer biology.

PB81-930000 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
A Subscription to the Complete Set of Cancergrams.
1981, approx. 1284 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Also available in single copies.

This subscription item makes available all of the cancergrams released yearly by the International Cancer Research Data Bank Program of the U.S. National Cancer Institute. Every few weeks updated cancergrams containing abstracts of selected cancer-related articles recently published in more than 1500 journals are announced. There are 107 different cancergrams topics available. The broad breakdown of these topics is as follows: Specific types of viruses; mechanism of viral carcinogenesis; other cancer birology topics; cancer immunology; cancer biochemistry and endocrinology; other cancer biology; types of carcinogenic agents; human carcinogenesis; carcinogenesis of specific organ sites; mechanism of carcinogenesis; detection and screening; diagnosis and therapy of specific types of cancer; specific therapeutic and diagnostic; and other aspects of cancer therapy.

PB81-930500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Oncofetal Proteins.
Cancergram CB01.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

No abstract available.

PB81-930600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: The Major Histocompatibility Complex.
Cancergram CB03.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

No abstract available.

PB81-930800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Immunobiology and Cancer: Tumor-Associated Antigens.
Cancergram CB05.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all tumor-associated and tumor-specific antigens (TSTA, TMTA, TATA, and TAA) with the exception of oncofetal antigens (covered by Cancergram B001) and viral antigens unrelated to neoplasia. Abstracts included concern both intracellular and surface antigens, with emphasis on the latter. Also covered are antigens from tumors derived from patients (colon cancer, leukemias, etc.) when studied from a non-clinical standpoint. Viral antigens, only when appearing concomitantly with tumors, and histocompatibility antigens, only when directly related to tumor incidence and development, are also within the scope of this Cancergram.

PB81-935400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Hormonal Carcinogenesis.
Cancergram CK05.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This cancergram deals with the role of hormones in the induction of cancer, including both endogenous hormones and biologically derived or synthetic compounds having hormonal or endocrine stimulating properties. Where related to carcinogenesis, the scope also includes endogenous substances (e.g., prostaglandins) or exogenous substances (e.g., nutrients) that interact with hormones. Abstracts included also concern endogenous hormonal states predisposing humans to development of cancer, or potentially of value in identifying humans at high or low risk. Selected articles on biological, biochemical, and physiological properties of the hormones that are relevant to their carcinogenic properties are included. Studies on viral-hormonal interactions are generally excluded. Basic cancer-related biology and biochemistry of steroid hormones are covered by Cancergram series CB07, and of non-steroid hormones by Cancergram series CB24.

PB81-935800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Mechanisms of Carcinogenesis: Activation and Metabolism of Carcinogens.
Cancergram CK08.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This is the first of a series of mechanism-oriented Cancergrams, and deals with the initial metabolic events occurring after exposure to chemical carcinogens. The scope includes the activation, metabolism, and detoxification of carcinogens; the biochemistry of carcinogen metabolites; the role and induction of enzymes in carcinogen metabolism; the role of metabolic activation in carcinogen screening tests; and other related studies. Macromolcular binding of carcinogen metabolites is included only where the studies provide evidence for metabolic activation or information about the chemistry of the metabolites; a comprehensive treatment of macromolecular binding is included in the second Cancergram of this series, CK11.

PB81-936100 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Mammary Gland.
Cancergram CK12.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers the occurrence, etiology, and introduction of mammary cancer in both humans and experimental animals. The roles of chemical and physical agents, exogenous and endogenous hormones, viral and infectious agents, individual personal practices, and genetic and constitutional states are all considered under the etiology and induction of tumors. The Cancergram also includes studies of possible mechanisms of carcinogenesis, cancer prevention measures, and immunological, biochemical, physiology, and morphological aspects of carcinogenesis in the breast. General studies of cancer biochemistry, immunology, physiology, or morphology, are included on a selective basis. This Cancergram generally excludes studies of diagnosis, treatment, and pathology of breast cancer, as these topics are covered by Cancergram CT09.

PB81-936200 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Modification of Carcinogenesis.
Cancergram CK04.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of modification of the basic carcinogenic process, including tumor promotion, cocarcinogenesis, anticarcinogenesis, synergism or antagonism between carcinogens, interaction of carcinogens with viruses, effects of carcinogens on the immunological and endocrine systems, and the effects of diet, genetic factors, hormones, immunological status, and environmental stress on the action of carcinogenic agents. The Cancergram includes studies of mechanisms of modification of carcinogenesis and selected papers on mechanisms of carcinogenesis or cancer biology where the results indicate the possibility of modification of the process. The major emphasis is on studies in model systems, although studies pertaining to possible interaction of etiologic factors in human cancer are also included. This Cancergram generally excludes studies of cancer therapy.

PB81-936300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Liver.
Cancergram CK16.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers all aspects of the etiology of cancer of the liver and biliary tract. Areas covered include occurrence and presumptive cause of hepatic cancer in the human population, experimental induction and modification of hepatic cancer, and morphological, biochemical, and other biological effects associated with the induction, development, or occurrence of hepatic cancer. Metabolism of known or suspected specific hepatocarcinogens is covered, but carcinogen metabolism is otherwise excluded, since this is the subject of Cancergram CK08. This Cancergram includes studies of biological or pathological phenomena associated with the presence of hepatic cancer, but generally excludes studies specifically related to diagnosis or treatment.

PB81-936600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Organ Site Carcinogenesis: Kidney and Urinary Tract.
Cancergram CK17.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all aspects of the etiology of cancer of the kidney and urinary tract. Areas covered include occurrence and presumptive cause of urinary tract cancer in human populations, experimental induction and modification of urinary tract cancer, and morphological, biochemical, and other biological effects associated with the induction, development, or occurrence of urinary tract cancer. This Cancergram specifically excludes carcinogenesis studies of the prostate, testes, scrotum, or penis, which are covered in Cancergram CK 18 (reproductive tract carcinogenesis). Studies concerning diagnosis, therapy, and pathology are generally excluded except where they contribute to the understanding of kidney and urinary tract carcinogenesis. Related clinical studies are the subject of Cancergram CT16, entitled Genito-urinary Cancers--Diagnosis, Treatment.

PB81-936000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Cancer Immunology and Immunotherapy.
Cancergram CT06.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

Clinical trials employing immunotherapy frequently involve patients with many different types of cancer. Accordingly, this Cancergram focuses on the immunotherapy employed rather than the disease diagnosis. Adoptive, active specific, and active nonspecific immunotherapy, as well as the agents used in these modes, are included. Also in scope are other approaches to immunotherapy such as immune stimulation and immune potentiation. Immune suppression, immune deficiency, immune competence, and other aspects of clinical immunology are included. Immunodiagnostic techniques are covered by a separate Cancergram series, CT01. Animal models, tissue culture experiments, carcinogenesis, and other preclinical studies are generally excluded, except for those considered to have direct clinical relevance.

PB81-938400 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Pediatric Oncology.
Cancergram CT10.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The concept of this topic includes childhood tumors of the kidney, brain and CNS system, lymphomas and sarcomas, and other soft tissue tumors. Abstracts concerning childhood leukemias are included only on a very selective basis, as the topic is comprehensively covered by Cancergram series CT03. This Cancergram covers clinically relevant aspects of the prevention, detection, evaluation, diagnosis, and therapy of solid tumors in children. With certain exceptions, the topic excludes animal studies, general preclinical studies, and general carcinogenesis studies, not directly relevant to clinical applications.

PB81-938500 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Neoplasia of the Head and Neck: Diagnosis, Treatment.
Cancergram CT11.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

No abstract available.

PB81-938600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Evaluation and Treatment of Multiple Myeloma and Other Gammopathies.
Cancergram CT13.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram concerns the clinical aspects of multiple myeloma and related disorders, including macroglobulinemia, light-chain disease, heavy-chain disease, amyloidosis, the monoclonal gammopathies, and other dysproteinemias. Because of coverage by other Cancergrams, the scope excludes the leukemias (see Cancergram series

CT03), and osteogenic sarcoma and other bone tumors (see Cancergram series CT12). This Cancergram covers diagnosis, staging, natural history, supportive care, evaluation techniques, and therapy. Selected abstracts will also be included concerning epidemiology, etiology, and other preclinical studies where they have direct clinical relevance.

PB81-938700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Sarcomas and Related Tumors: Diagnosis, Treatment.
Cancergram CT12.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram focuses on clinical aspects of sarcomas involving soft tissue and bone, and also includes abstracts on related malignant and benign tumors. Soft tissues are considered as all non-epithelial extra-skeletal tissues of the body, with the exception of the reticuloendothelial system, the neuroglia, ad visceral and parenchymal organs. Included, therefore, are sarcomas of the vascular system, fatty tissues, muscle tissues, connective tissues, and synovial tissues. Bone tumors included are osteosarcoma, chondrosarcoma, adamantinoma, chondroblastoma, Ewing's sarcoma, and other benign and malignant disorders of the bone. This Cancergram excludes disorders of the bone marrow, which are the subjects of separate cancergrams (see series CT03 for leukemias and series CT13 for multiple myeloma). The scope includes diagnosis and staging, supportive care, evaluation, and therapy. Selected abstracts concerning epidemiology, etiology, and other preclinical studies will also be included where they have direct clinical relevance.

PB81-938800 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Genito-Urinary Cancers: Diagnosis, Treatment.
Cancergram CT16.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram provides access to current oncology information concerning the male genital tract and the male/female urinary tract. It excludes the female genital tract, which is covered in Cancergram CT17. The scope includes both common and rare GU tumors, and certain tumor types which occur at GU sites nonspecifically. Abstracts included concern primarily the clinical aspects of GU tumors including case histories, etiology, epidemiology, detection, screening, diagnosis, therapy, and rehabilitation. Selected preclinical studies of special relevance to clinical situations will also be included. Related carcinogenesis studies are covered by Cancergrams CK17 (Kidney and Urinary Tract) and CK18 (Reproductive Tract).

PB81-939000 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Clinical Treatment of Cancer: Radiation Therapy.
Cancergram CT15.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all forms of radiotherapy being used in the treatment of cancer, including standard X-ray, cobalt 60 and radium irradiation as well as high linear energy transfer (LET), megavoltage, electron beam treatment, and radioactive interstitial implants. Coverage of this topic includes adverse effects of radiotherapy, radiocurability, radiodosimetry, radiosensitazation, and studies with specialized instrumentation such as the betatron and linear accelerator. Radiobiology, animal experiments, tissue culture experiments, carcinogenesis, and other preclinical studies will not be included except for those considered to have direct clinical relevance.

PB81-939300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Detection and Management: Biological Markers.
Cancergram CT01.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram provides research information on tumor markers of clinical importance. Tumor markers are here considered as any condition or parameter detectable in cancer patients which relates to the presence of a tumor. This includes any detection system related to tumor products, tumor product activity, or host responses to tumor products. Of spceific interest are reports concerning markers for the risk, presence, extent, stage, or histological type of cancer in patients. This includes reports on new tests (marker candidates), the development or improvement of tests of techniques, and the clinical use and appraisal of such tests. As the emphasis is on clinically important markers, preclinical material lacking direct clinical importance is largely excluded.

PB81-939600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Melanoma and Other Skin Cancer: Diagnosis, Treatment.
Cancergram CT22.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This Cancergram covers all clinical aspects of malignant melanoma involving the skin, as well as other organ systems. Also covered are any other tumors arising in the skin or appendages of the skin, such as the sweat glands, apocrine glands, eccrine glands, or sebaceous glands. Epidermoid conditions, epithelioma, keratinizing conditions, and squamous cell, giant cell, and basal cell carcinomas of the skin as included. In addition, Paget's disease, Kaposi's sarcoma, and Letterer-Siwe disease are included when they involve the skin or its appendages. All clinical studies of the diagnosis, immunology, and treatment of these cancers are covered. Additionally, the Cancergram includes selected aspects of etiology and epidemiology, and preclinical studies in animal and in vitro systems which are directly relevant to clinical oncology. Mycosis fungoides is excluded, however, because it is covered by Cancergram CT05, Lymphomas.

PB81-939700 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Rehabilitation and Supportive Care.
Cancergram CT20.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram covers physical and psychological rehabilitation of the cancer patient. This includes the use of prostheses and braces, physical therapy, speech therapy, orthoses, and occupational therapy. It will also cover psychological therapy and counseling of the patient as well as studies of the psychosocial effects of cancer on the patient and his family. Nutritional support and nursing care are two areas of supportive care which are covered. Included are studies of taste, nutritional status, caloric intake and expenditure, special diets and nutrients, parenteral feeding, and hyperalimentation in the cancer patient. All aspects of the nursing care of the cancer patient are covered by this Cancergram.

6F. Environmental Biology

AD-A094 193/0 PC **A04**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Feasibility of Monitoring Pesticide Breakthrough from Charcoal Columns.
Final comprehensive rept. 1 Oct 78-30 Nov 79,
Donald R. Sellers. Sep 79, 55p
Contract DAMD17-78-C-8069

Eel cholinesterase test tickets and procedures were tested and modified to be sensitive to Baygon, carbaryl, diazinon, Dursban, and malathion for the rapid detection of these pesticides in water. Detection limits for all the pesticides in water were below 10 ppm using the enzyme test tickets and pretreatment with bromine. The tickets were stable during storage at 4 C or 40 C for at least 8 months. Bimolecular rate constants were determined for the inhibition of cholinesterase in solution. (Author)

AD-A094 425/6 PC **A03**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Environmental Lab.
Aquatic Habitat Studies on the Lower Mississippi River, River Mile 480 to 530. report 4. Diel Periodicity of Benthic Macroinvertebrate Drift.
Miscellaneous paper,
C. Rex Bingham, Stephen P. Cobb, and A. Dale Magoun. Dec 80, 36p Rept no. WES/MP/E-80-1

A diel periodicity study of drifting benthos in the lower Mississippi River at mile 529 resulted in the collection of 5090 macroinvertebrates consisting of 80 taxa. Samples collected with 505 micrometer mesh, 0.5-m (mouth diameter) plankton nets at midnight (0100 hr), dawn (0600 hr), noon (1200 hr), afternoon (1600 hr), and dusk (2100 hr) on 27-28 June 1978, had an average total drift density over all sampling times of 140 organisms/100 cubic meters of water filtered. Total drift density did not fluctuate markedly over the five sampling times, except that concentrations were significantly lower ($P < 0.05$) at dawn than at other times. The lack of pronounced diel periodicity in total drift resulted from the offsetting of dominant day active versus night active species.

AD-A094 497/5 PC **A10**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Environmental Engineering and Ecological Baseline Investigations along the Yukon River-Prudhoe Bay Haul Road.
Final rept. 1975-1978,
Jerry Brown, and Richard L. Berg. Sep 80, 207p Rept no. CRREL-80-19

During the period 1975-1978 the Federal Highway Administration sponsored a series of environmental engineering investigations along the Yukon River to Prudhoe Bay Haul Road. In 1976 the Department of Energy joined these investigations with a series of ecological projects which continue to the present. Both agencies' research efforts were conducted on a cooperative basis with CRREL's in-house research program. The objectives of the research focused on (1) an evaluation of the performance of the road(2) an assessment of changes in the environment associated with the road, (3) documentation of flora and vegetation along the 577-km-long transect, (4) methodologies for revegetation and restoration, and (5) an assessment of biological parameters as indicators of environmental integrity. In support of these objectives, specific studies were undertaken that investigated the climate along the road, thaw and subsidence beneath and adjacent to the road, drainage and side slope performance, distribution and properties of road dust, vegetation distribution, vegetation disturbance and recovery, occurrence of weeds and weedy species, erosion and its control, revegetation and restoration, and construction of the fuel gas line. This report presents background information on the region, detailed results of the road thaw subsidence and dust investigations, and summaries of revegation, fuel gas line, vegetation distribution, soil, and weed studies. (Author)

AD-A094 607/9 PC **A03**/MF **A01**
Johnson State Coll.,VT.
Effects of a Tundra Fire on Soils and Plant Communities along a Hillslope in the Seward Peninsula, Alaska.
Charles Racine. Nov 80, 26p CRREL-SR-80-37
Contract DACA89-79-M-1816

During summer 1977, wildfires burned extensive areas of low arctic tundra in the Seward Peninsula,

Alaska. The present study was initiated in July 1978 to determine the effects of these fires on tundra soils and vegetation. Nine 10- x 1-m permanent transects were established at regular intervals along the topographic gradient of a burned hillslope in the central Seward Peninsula near Imuruk Lake. Soil characteristics and plant species density and cover were determined in each of the 90 1- x 1-m plots on this slope during July of both 1978 and 1979. Soils and vegetation had been quantitatively sampled on this slope in 1973, thereby providing pre-fire comparisons; a sedge tussock-shrub tundra community with mud circles occupied the poorly drained footslope and a birch and ericaceous shrub tundra community wth elongate turf-banked frost boils had developed on the moderately well drained backslope. The broad, poorly-drained summit was occupied by sedge-shrub tundra with low-centered polygons. The severity of burning in July 1977 varied along this slope with moderate to heavy burning of the birch and ericaceous shrub tundra and light to moderate burning of the sedge tussock-shrub tundra and sedge-shrub tundra communities. Post-fire (1978 and 1979) changes in plant cover, species composition and soil thaw depths are shown to vary with position on the slope and burning severity. The relationship of these changes to natural succession in the absence of fire is discussed. (Author)

NUREG/CR-1795 PC **A03**/MF **A01**
Lehigh Univ., Stone Harbor, NJ. Wetlands Inst.
Ecological Studies of Wood-Boring Bivalves in the Vicinity of the Oyster Creek Nuclear Generating Station.
Progress rept. 1 Mar-31 May 80,
K. E. Hoagland, and L. Crocket. Dec 80, 36p

The species composition, distribution, and population dynamics of wood-boring bivalves are being studied in the vicinity of the Oyster Creek Nuclear Generating Station, Barnegat Bay, New Jersey. Untreated wood test panels are used to collect organisms at 12 stations. Physiological tolerances of 3 species are also under investigation in the laboratory. The native species Teredo navalis and Bankia gouldi coexist with the introduced T. bartschi in Oyster Creek, at the mouth of Forked River and on the coast of the bay between the two creeks. Heavy mortality occurred in all species during winter and spring when the generating station was not operating. Temperature and salinity tolerance tests begun during April and May, 1980, were not completed by the end of May because the adult shipworms proved to be very resistant to drastic changes in these physical parameters.

PB81-134884 PC **A03**/MF **A01**
Alaska Univ., Fairbanks. Inst. of Water Resources.
Variation in Invertebrate Drift in Subarctic Alaskan Streams.
Technical completion rept.,
Jacqueline Doyle LaPerriere. Aug 80, 30p
COMPLETION-77-22-A, W81-00974, OWRT-A-061-ALAS(1)
Contract DI-14-34-001-9002

Data from thirteen streams in interior, subarctic Alaska are analyzed to find predictive equations that explain the amount of invertebrate fish-food drifting in the water column. The alkalinity of the water and the stream's average velocity are found to be the factors that influence the amount of drift expressed as concentration or export rate.

PB81-134892 PC **A02**/MF **A01**
Alaska Univ., Fairbanks. Inst. of Water Resources.
Effect of Nutrient Manipulation on Plankton Community Structure,
Douglas Lang, and Edward J. Brown. Oct 80,
12p COMPLETION-79-10, W81-00973, OWRT-A-066-ALAS(1)
Contract DI-14-34-001-9002

The primary objective of this study was to use laboratory continuous cultures to evaluate the effect of changing macronutrient ratios on the microplankton species compositions of lake ecosystems. The heterotrophic yeast could out-compete the green alga for phosphate, so the alga only predominates when carbon severely limited the growth of the yeast. Most evidence indicates that heterotrophes are better competitors for mineral nutrients (like phosphorus) than are algae. Thus, in oligotrophic systems, the total biomass of the microplankton community may be limited by a mineral nutrient, but the community structure may be regulated by the type of organisms availsbie to the heterotrophic population. The dominance of unicellular blue-greens in oligotrophic systems (since they are better competitors for phosphorus than the yeast or green alga) may be due to their ability to take up dilute phosphorus. As nutrient concentrations increase towards eutrophy, other factors such as zooplankton grazing and allelopathy may be most important in determining the structure and biomass of the microplankton community.

PB81-135329 PC **A06**/MF **A01**
Medical Coll. of Wisconsin, Milwaukee.
Uptake, Metabolism, and Disposition of Xenobiotic Chemicals in Fish. Wisconsin Power Plant Impact Study,
John Lech, and Mark Melancon. Aug 80, 157p
EPA-600/3-80-082
Grant EPA-R-803971
Prepared in cooperation with Madison Gas and Electric Co., Wisconsin, Wisconsin Public Service Corp., Green Bay, Wisconsin Public Service Commission, Madison, and Wisconsin Dept. of Natural Resources, Madison.

The effects and fate in fish of a number of chemicals, including hydrocarbons and chlorinated hydrocarbons, have been examined. The interactions between these chemicals and fish have been studied using several approaches. The uptake an elimination of 14C-labeled napthalene, 2-methylnapthalene, 1,2,4-trichlorobenzene, pentachlorophenol, and pentachloroanisole were studied. Each of these chemicals was taken up rapidly by rainbow trout. Increasing the duration of exposure to 14C-napthalene or 14C-2-methylnapthalene affected the elimination of 14C-containing components from these fish. Activities of cytochrome P-450-related xenobiotic metabolizing enzymes in rainbow trout livers were induced. The quantities of biliary metabolites in these fish were considerably higher than those found in non-induced trout. Piperonyl butoxide reduced levels of biliary metabolites of pentachloranisole and di-2-ethylhexylphthalate in trout and increased tissue levels of these chemicals. The high levels of biotransformation products of these chemicals found in fish bile during and after exposure to the chemicals in these studies support the possible use of bile sampling in pollutant-modelling programs.

PB81-135436 PC **A05**/MF **A01**
Hawaii Univ., Honolulu. Water Resources Research Center.
Ecological Response to Relaxation of Sewage Stress Off Sand Island, O'ahu, Hawai'i.
Technical rept. 1 Nov 78-31 Aug 79,
Steven J. Dollar. Jul 79, 84p TR-124, W81-00983
Grant DI-14-34-0001-9013

The largest domestic sewage outfall in Hawaii discharged 3 cu m/s (62 mgd) of raw sewage in 10 m of water approximately 1,000 m off Sand Island, Oahu, from 1955 to 1977. Results of an ecological field study of epibenthic communities in proximity to Sand Island conducted in 1975 and 1979 show clear patterns of community change associated with both sewage impact and relaxation of this stress. Negative community effects attributable to sewage input decreased, and degree of recovery of community structure increased with distance from the point source of discharge.

PB81-140485 PC **A02**/MF **A01**
Intermountain Forest and Range Experiment Station, Ogden, UT.
Aquatic Macroinvertebrates within the Phosphate Mining Area of Eastern Idaho.
Forest Service research note,
William S. Platts, and Douglas A. Andrews. Dec 80, 18p FSRN-INT-298

The composition and diversity of benthic macroinvertebrates in the upper Blackfoot River drainage were recorded during the summer and fall of 1973, 1974, and 1976 to provide data for future assessment of mining impact. Analyses revealed the number of taxa, many of which were widely distributed, to be large (84). The benthic taxa of the upper Blackfoot River and its tributaries compare favorably with those of several unpolluted streams of southeastern Idaho. Several stations had large standing crop changes, but the causes of these changes are unknown.

PB81-144461 PC **A05**/MF **A01**
Michigan Univ., Ann Arbor. Great Lakes Research Div.
Characteristics of Benthic Algal Communities in the Upper Great Lakes,
E. F. Stoermer, and Nelson A. Thomas. Jul 80,
81p EPA-600/3-80-073
Grant EPA-R-803037

The upper Great Lakes contain a diverse array of benthic algal communities. Characteristic communities occupy substrates from the supralittoral to depths in excess of 30 m. Diatoms are the dominant taxonomic group present in terms of numbers, and usually in terms of biomass, except in eutrophic areas. Communities in areas receiving minimal direct anthropogenic impact are extremely diverse in terms of both species richness and population evenness. The populations which comprise these communities are generally reported from extremely oligotrophic habitats. A significant number of populations found in undisturbed habitats in the upper Great Lakes have not been previously reported from North America. Benthic communities in more eutrophic areas are characterized by a greater abundance of eurytopic and widely distributed taxa. Many of these species are familiar elements of the floras of smaller, mesotrophic to eutrophic lakes. The communities of directly impacted areas contain a more limited suite of very tolerant populations, usually occurring in high abundance.

PB81-802928 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Biological Pest Control. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 168p
Supersedes PB80-803067, and NTIS/PS-78/1290.

Research reports are cited on the use of microorganisms, animals, and insects as agents of pest control. Predator and parasite relationships of the biological agents to insects, plants, and other pests are covered. (This updated bibliography contains 163 citations, 36 of which are new entries to the previous edition.)

6H. Food

PB81-140873 PC **A04**/MF **A01**
International Center for Living Aquatic Resources Management, Manila (Philippines).
Food Potential of Aquatic Macrophytes,
Peter Edwards. Mar 80, 55p ICLARM STUDIES AND REVIEWS-5
Prepared in cooperation with Asian Inst. of Tech., Bangkok (Thailand). Also pub. as ISSN-0115-4389.

A review is presented of the pathways in which aquatic macrophytes may be involved in the food production process, directly as human food, as livestock fodder, as fertilizer (mulch and manure, ash, green manure, compost, biogas slurry), and as food for aquatic herbivores, such as fish, turtles, rodent and manatees. An attempt is made to identify the strategies which may have the greatest potential at present. The following research areas are suggested as worthy of attention: protein content and yield of Ipomoea aquatica and Neptunia oleracea, two vegetables which grow year round in the tropics and can be propagated from cuttings; protein content and yield of various types of duckweed in the tropics as a function of different concentrations of various organic wastes; Azolla and filamentous blue green algae as biofertilizers; composting aquatic macrophytes and the use of the compost as an organic fertilizer in fish ponds; aquatic macrophytes in biogas production and the use of the slurry as an organic fertilizer in fish ponds, and the feasibility of stocking herbivorous fish in irrigation systems with large aquatic macrophyte populations.

PB81-150138 PC **A04**/MF **A01**
Agricultural Research Service, Hyattsville, MD. Consumer and Food Economics Inst.

Food Composition Data, Food Names and Identification Numbers, Data Sets 456-1 and 456-2.
May 77, 60p CFE-ADM-338

No abstract available.

PB81-802076 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Food Taste. 1977-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1977-Jan 81.
Jan 81, 156p
Supersedes PB80-802721, and NTIS/PS-78/1199. See also 1964-1976, NTIS/PS-78/1198.

Various aspects of food taste are cited, including food additives, preservatives, and natural foods as well as the effects of food storage, irradiation, and processing. Meats, vegetables, baked products, and beverages are also included. (This updated bibliography contains 148 citations, 17 of which are new entries to the previous edition.)

PB81-935300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Dietary Aspects of Carcinogenesis.
Cancergram CK03.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

The Cancergram deals with all aspects of the relationship of diet to occurrence of cancer in man. The scope includes natural carcinogens in foods or beverages, potential carcinogens introduced by contamination or processing, the role of essential nutrients in the development of cancer, studies on the nutritional aspects of the etiology of human cancer, and selected articles on screening methods and public policy that relate to diet and carcinogenesis. The scope includes both epidemiological studies and studies on the mechanisms by which carcinogens may arise in food or nutrients and may affect the development of cancer. The Cancergram generally excludes purely agent-oriented articles, and specifically excludes articles not related to diet or food.

6J. Industrial (Occupational) Medicine

PB81-143000 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-66-542, U.S. Steel South Works, Chicago, Illinois,
S. M. Brooks. Nov 78, 45p NIOSH-HE-78-66-542

An occupational and medical questionnaire, chest examination, and pulmonary function tests, were completed on 70 foundry workers to determine any health hazards caused by exposure to silica dust at U.S. Steel South Works (Standard Industrial Classification-3312) in Chicago, Illinois on April 19 to 21, 1978. An unidentified source requested the evaluation to investigate the possible occurrence of silicosis among the workers. Nine cases of silicosis were identified through the medical evaluation. Other disorders included allergic rhinitis, chronic bronchitis, wheezing, repeated chest infections, and shortness of breath. Twenty-seven percent of the chest examinations were positive and pulmonary function tests were abnormal in 33 percent of the workers. Six additional cases of silicosis were identified by review of company records. The author concludes that a health hazard due to overexposure of free silica dust existed at this facility in the past and at the time of this evaluation. The current medical evaluation program for workers exposed to free silica is inadequate. An environmental and medical program should be established, including an industrial hygiene program, work safety practices, proper protective equipment, dust monitoring, preplacement and periodic medical examinations, and medical management of employees with suspected or diagnosed silicosis.

PB81-143018 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-94-538, Mark Steel Corporation, Salt Lake City, Utah,
M. T. Okawa. Nov 78, 11p NIOSH-HE-78-94-538

Environmental surveys were conducted on June 20 and 21, 1978, to evaluate the potential health hazard of an abrasive, made from lead smelter slag, used in the abrasive blasting operation at the Mark Steel Corporation (SIC-3325) in Salt Lake City, Utah. The evaluation was requested by a company representative on behalf of two affected employees. The bulk abrasive grit sample contained less than 1 percent silicon dioxide (7631869). Three of four respirable dust samples contained no silica and concentrations of respirable dust ranged from 3.4 to 4.7 milligrams per cubic meter (mg/cu m), which were below the OSHA standard of 5.0mg/cu m. No cadmium (7440439) was detected in any of the samples. Lead (7439921) concentrations ranged from 0.25 to 2.34mg/cu m, esceeding the 0.20mg/cu m OSHA standard. Arsenic (7440382) concentrations ranged from 29.0 to 69.1 micrograms per cubic meter, exceeding the 10.0 micrograms per cubic meter OSHA standard. The author concludes that employees working at the abrasive blasting operation are potentially exposed to toxic airborne concentrations of inorganic lead and inorganic arsenic, and that employees may be exposed to excess concentrations of crystalline silica. A substitute grit should be considered, a medical monitoring program should be instituted, and a respiratory protection program should be provided for concerned employees.

PB81-143034 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-21-539, Champion Building Products, Bonner, Montana,
B. J. Gunter, A. G. Anpol, and J. Lybarger. Nov 78, 24p NIOSH-HE-78-21-539

Concentrations of alpha-pinene, beta-pinene and primaric acids were measured on February 5 to 9, 1978, and pulmonary function tests of workers were conducted on February 6 to 10, 1978 at the Champion Building Products (Standard Industrial Classification-2435) in Bonner, Montana. The Lumber and Sawmill Workers L.P.I.W. Local Union 3038, Missoula, Montana requested the evaluation to determine the potential exposure to plywood veneer dryer emissions for 475 affected workers. Total acid concentrations ranged up to 2.5 milligrams per cubic meter (mg/cu m). Pinene concentrations ranged from 0.55 to 14.13mg/cu m. No environmental standards exist for these substances. Common medical complaints were upper respiratory irritation, dry throats, stuffy nose, running nose, coughing, burning or itching eyes, chest tightness or wheezing. Pulmonary function tests did not reveal any significant impairments among the workers. The authors conclude that no significant health hazard exists for workers at this facility. They recommended that door seals on veneer dryers be cleaned and repaired to prevent leakage, shroud be placed over both feeder and offbear ends with feeders positioned outside the shroud, and roof ventilators consist of exhaust fans inside the shrouded areas. Exhaust emissions should not be permitted to reenter the same or other work areas. Pre-assignment and periodic medical examinations for workers also are recommended, along with employee education on the irritant effects produced by veneer dryer emissions.

PB81-143042 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HHE 79-1-554, La Salle College, Philadelphia, Pennsylvania,
W. J. Chrostek. Jan 79, 10p NIOSH-HE-79-1-554

Environmental surveys were conducted on October 19, 1978, to evaluate employee exposures to lead (7439921) fumes, carbon monoxide (630080), and nitrogen dioxide (10102440) gases in the indoor firing range at La Salle College (SIC-9711) in Philadelphia, Pennsylvania. The evaluation was requested by an authorized representative of the Department of Military Science on behalf of the approximately two affected employees. Personal air lead samples ranged from 319 to 583 micrograms per cubic meter and general air lead samples ranged from 511 to 791, exceeding the 200 micrograms per cubic meter OSHA standard. Concentrations of carbon monoxide and nitrogen dioxide were below their respective evaluation criteria. The author concludes that a health hazard did exist due to exposures to lead. The author recommends that an extensive ventilation system be installed and maintained, that appropriate sound proofing measures be taken to minimize sound levels, that cleanup be done using vacuum cleaning equipment and respirators, that instructors be monitored for blood lead concentrations and be rotated with other duties periodically, and that eating, drinking, and smoking in the range be prohibited.

PB81-143067 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 77-75-494, Dawes Laboratories, Chicago Heights, Illinois,
C. R. Meyer. Jun 78, 22p NIOSH-HE-77-75-494

Exposures to diethylstilbestrol (56531) (DES) were evaluated at the Dawes Laboratories (SIC-2843) in Chicago Heights, on May 16 and 17, 1977. An evaluation request on behalf of approximately 15 to 25 individuals came from the Oil, Chemical and Atomic Workers Union Local 7-765 and the international office of the union. Workers were given complete medical examinations, and blood and urine DES concentrations were determined. Serum hormone concentrations also were measured. Total androgens and the free androgen index were decreased in workers with high DES exposure. Women commonly reported breast tenderness. Plasma DES concentrations ranged from less than 56 to 272 picograms per milliliter. DES concentrations in urine ranged from less than 21 to 286 picograms per milliliter. The author concludes that a health hazard exists at this company from overexposure to DES. Medical surveillance, careful record maintenance, engineering changes and the use of personal protective equipment are recommended.

PB81-143075 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 77-96-495, New York Telephone Company, New York, New York,
N. L. Fannick. Jun 78, 7p NIOSH-HE-77-96-495

Breathing zone and personal air samples were analyzed for lead (CAS 7439-92-1) (Pb) to determine exposures to New York Telephone Company (SIC-3661) workers engaged in underground operations involving repairs to old telephone cables. An evaluation request came from the Communications Workers of America, Local 1106. The number of affected workers was not specified. All samples were below the OSHA standard of 200 milligrams per cubic meter. The author concludes that there was no health hazard from exposure to Pb among the telephone workers.

PB81-143083 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-54-518, FMC Corporation, Broomfield, Colorado,
B. J. Gunter. Aug 79, 11p NIOSH-HE-78-54-518

Environmental and medical surveys were conducted on April 11, 1978, to evaluate exposures to Freon-11R (75694), hydrofluoric acid (7664393), nitric acid (7697372), and acetone (67641) during the etching and polishing of components at the FMC Corporation in Broomfield, Colorado. The

evaluation was requested by a management representative on behalf of approximately 25 affected employees. Environmental air samples were all within the most recent evaluation criteria. Confidential employee interviews showed no health complaints or symptoms. The author concludes that a health hazard did not exist at the time of the evaluation. The author recommends that adequate protection be provided against accidental exposure to hydrofluoric acid and that all ventilation hoods be checked frequently to ensure proper air flow.

PB81-143091 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-62-526, Littleton Veterinary Clinic, Littleton, Colorado,
G. E. Burroughs. Sep 78, 13p NIOSH-HE-78-62-526

General area and breathing zone sampling was conducted on May 25, 1978 to measure concentrations of halothane (151677) at the Littleton Veterinary Clinic (SIC-0741) in Littleton, Colorado. An evaluation request came from the management of the clinic on behalf of 5 affected employees. Halothane concentrations measured by solid sorbent tubes ranged from 4.3 to 20.5 parts per million (ppm). Concentrations ranged from 1 to over 50ppm as measured by infrared spectrometry. The authors conclude that a health hazard exists from exposure to halothane. They recommend that exposures should be reduced to below 2ppm during surgical procedures, a scavenging system be installed for the ventilator, fittings be tightened, equipment be checked periodically, the breathing system be pressurized, and the check valves be tested.

PB81-143109 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-27-551, Bomber Bait Company, Gainesville, Texas,
H. L. Markel, and T. Thoburn. Dec 78, 14p NIOSH-HE-78-27-551

Environmental and breathing zone samples were taken to measure concentrations of toluene (CAS 108-88-3), xylene (CAS 1330-20-7), acetone (CAS 67-64-1), methyl ethyl ketone (CAS 78-93-3), ethylene glycol monoethyl ether acetate and fibrous glass at the Bomber Bait Company (SIC-3949) in Gainesville, Texas on December 7, 1977. The evaluation was requested by the employer on behalf of approximately 19 employees. Workroom concentrations of all chemicals measured were below applicable OSHA standards. Workers reported skin irritations involving primarily the face, neck, shoulders, upper back, chest and arms. Symptom onset coincided with the use of the heat phase of the heating and cooling ventilation system. Air samples from the duct outlets contained significant amounts of fibrous glass. The authors conclude that the skin irritations were due to the fibrous glass. They recommend that painted lures not be placed beneath the ceiling return air grills, that workers use protective clothing, and that thinners and solvents are kept in containers with self closing lids.

PB81-143117 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-128-549, Nixon Power Plant, Colorado Springs, Colorado,
B. J. Gunter. Dec 78, 7p NIOSH-HE-78-128-549

Asbestos (CAS 1332-21-4) concentrations during sanding and buffing operations were measured at the Nixon Power facility (SIC-4911) in Colorado Springs, Colorado on September 29, 1978. The evaluation was requested by the vice president of the Watkin Construction Company on behalf of plumbers engaged in sanding asbestos joints and connections. Breathing zone asbestos concentrations of fibers greater than five microns in length ranged from 0.02 to 0.187 fibers per cubic centimeter. The OSHA asbestos standard of 2 fibers per cubic centimeter was not exceeded, however, the author concludes that a potential asbestos hazard does exist. He recommends that respirators be used by workers until exhaust ventilation is provided.

PB81-143620 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-80-521, Denver General Hospital, Denver, Colorado,
B. J. Gunter. Aug 78, 13p NIOSH-HE-78-80-521

Environmental breathing zone samples were collected on June 17 and 18, 1978, to determine concentrations of halothane (CAS 151-67-7), ethrane (CAS 13838-16-9), and nitrous oxide (CAS 10024-97-2) in the operating rooms of Denver General Hospital (SIC-8062) in Denver, Colorado. The evaluation was requested by the Chief of Anesthesiology on behalf of approximately 70 affected employees. The NIOSH standard of 0.5 parts per million (ppm) was exceeded in one out of 20 samples for ethrane and in two of 20 samples for halothane. Nitrous oxide concentrations exceeded the NIOSH recommended concentration of 25ppm in 6 of 65 samples. The author concludes that chemical concentrations were extremely low and did not pose an immediate danger to the health of the operating room personnel. The author recommends that concentrations be reduced to below NIOSH standards, that anesthetic equipment be checked and maintained on a regular basis and that operating rooms be monitored at least once a year to ensure that workers are not overexposed to waste anesthetic gases.

PB81-143646 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-8-534, Chilton Metal Products, Chilton, Wisconsin,
C. J. Bryant. Oct 78, 21p NIOSH-HE-78-8-534

Environmental and medical surveys were conducted on December 14, 1977, April 18 to 20, 1978, and May 18, 1978, to evaluate employee exposure to potentially toxic substances at Chilton Metal Products (SIC-3291) in Chilton, Wisconsin. The evaluation was requested by an authorized employee representative on behalf of the 300 affected employees. Carbon monoxide (630080) concentrations ranged from 41 to 118 parts per million (ppm) for short term detectors and from 25 to 106ppm for long term detectors, exceeding the 50ppm OSHA standard. Chlorodifluoromethane (75456) (Freon-22) concentrations ranged from 2,906 to 3,146ppm, exceeding the American Conference of Governmental Industrial Hygienist standard of 1000ppm. All other environmental samples were below their respective criteria. The author concludes that workers are exposed to hazardous concentrations of carbon monoxide. The Freon-22 concentrations present a potential exposure hazard. The author recommends that exposure to carbon monoxide be reduced through conversion of gasoline powered lift trucks to low pressure gas or the use of catalytic converters, that the ventilation system be modified, that an exhaust ventilation system be completed at the bottled gas filling apparatus, and that present exhaust ventilation systems be flanged.

PB81-143687 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-23-530, the New York Times Co., Inc., Carlstadt, New Jersey,
N. L. Fannick. Sep 78, 8p NIOSH-HE-78-23-530

Environmental and medical surveys were conducted on October 20 and 31, 1977, to evaluate worker exposres to organic solvents at The New York Times Company, Incorporated printing facility (SIC-2711) in Carlstadt, New Jersey. The evaluation was requested by a company representative for an unspecified number of employees. Aliphatic concentrations ranged from 4 to 815 milligrams per cubic meter (mg/cu m) aromatics from 16 to 1205mg/cu m and naphthalene (91203) from 0.04 to 12mg/cu m. All concentrations were below the applicable OSHA standards. The author concludes that workers are not exposed to excessive solvent concentrations. He recommends that approved organic vapor respirators and portable exhaust ventilation be used during clean up operations, heaters be added to the ventilation system for use during cold weather, the supplier of one of the solvents be informed that the product contains naphthalene, and that a buddy system be established to insure prompt removal from exposure of any worker who might be incapacitated while cleaning inside the presses.

PB81-143695 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-70-528, Hospal Medical Corporation, Littleton, Colorado,
R. L. Ruhe. Sep 78, 19p NIOSH-HE-78-70-528

Personal and general air samples were taken on May 23 and 24, 1978 at Hospital Medical Corporation (SIC-8069) in Littleton, Colorado to determine employee exposure to toxic concentrations of toluene (108883), methylene chloride (75092), xylene (1330207), acetone (67641), 1,1,1-trichloroethylene (79016), methyl ethyl ketone (78933), vinyl chloride (75014), ethylene oxide (75218), methylene bisphenyl isocyanate (101688) (MDI), oil mist, lead (7439921) (Pb), and tin (7440315). The evaluation was requested by the management on behalf of about 100 affected employees. All sample measurements were below OSHA recommended standards. The authors conclude that a health hazard did not exist at the time of the survey. They recommend that workers should not inhale vapors coming from the sterilization unit; entrance to the ethylene oxide area should be restricted; employees should be educated about the hazards associated with the production process materials; and good work practices and first aid should be taught.

PB81-143703 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-17-567, Kawecki Berylco Industries, Inc., Reading, Pennsylvania,
B. A. Hollett. Mar 79, 24p NIOSH-HE-78-17-567

Personal breathing zone samples were collected and analyzed for Beryllium (7440417) (Be) dust, employee medical interviews and conferences with management were held, and work practices, conditions, and exposure controls were observed at the Kawecki Berylco Industries, Inc. (SIC-5052) in Reading, Pennsylvania on January 10 to 11, 1978. The request was made by an employees' representative for the Kawecki Berylco Hygiene Assistants regarding exposure of approximately 400 employees to asbestos (1332214) and Be. Asbestos activities were not observed during this survey. Breathing zone samples for the 3.5 hour morning maintenance activities contained 58 (cu/m3) and 64 micrograms per cubic meter (cu m) of Be dust, and the 3 hour afternoon maintenance activities contained 15 and 4.0 micrograms/cu m, all exceeding the OSHA standard concentration of 2.0 micrograms/cu m. The author recommends that asbestos be replaced with other materials in the reflock activity and respirator protection and decontamination facilities, and that locker rooms and showers be provided to reduce exposure to beryllium dust or contaminated clothing and personnel. Engineering process modifications and other controls to reduce worker exposure to Be also were recommended.

PB81-143711 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-107-563, Swinston Company, Pittsburgh, Pennsylvania,
J. R. Kominsky. Feb 79, 8p NIOSH-HE-78-107-563

Concentrations of isophorone (78591), acetone (67641), xylene (1330207), and toluene (108883) were measured in the silk screen printing operation of the Swinston Company (SIC-2262) in Pittsburgh, Pennsylvania on September 12 to 14, 1978. The evaluation was requested by an authorized representative of an unspecified number of employees of the company. Breathing zone air samples and a medical questionnaire were completed. Concentrations of acetone, xylene, and toluene were all below published occupational health criteria. One isophorone measurement of 25.7 parts per million (ppm) was above the OSHA 8 hour standard of 25ppm and could have caused the eye and nose irritation noted by an employee. The investigator recommends that a respirator be provided until local exhaust ventilation is improved, a respiratory protection program be established, protective clothing be worn, fire hazards be controlled, and the floor fan be modified.

PB81-143729 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-61-497, Camp Hill Animal Hospital, Camp Hill, Pennsylvania,
C. L. Moseley. Jun 78, 14p NIOSH-HE-78-61-497

Breathing zone and general area samples were taken for halothane (CAS 151-67-7) at the Camp Hill Animal Hospital (SIC-0742) in Camp Hill, Pennsylvania and anesthesia machines were evaluated for leakage on April 27 and 28, 1978. An evaluation request came from the employer to evaluate the potential for exposure to 6 employees and to provide information on the chronic effects of halothane. Personal breathing zone and general area samples were obtained. Eight of 9 personal breathing zone samples ranging from 4 to 21 parts per million (ppm) halothane exceeded the recommended criteria of 2ppm. Area samples averaged 1.3 to 4.7ppm. Gas leakage from gas machines ranged from 2 to over 60ppm. The author concludes that a health hazard due to halothane exposure does exist at this facility. A scavenging system should be used to recirculate unused gas, anesthetic gases should be used sparingly, equipment should be checked routinely for leaks or loose connections, and ventilation should be improved.

PB81-143828 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 77-83-532, Norton Company, Plastics and Synthetics Division, Akron, Ohio,
S. A. Salisbury. Oct 78, 16p NIOSH-HE-77-83-532

Environmental and medical surveys were conducted on August 2 and 3, 1977, to evaluate employee exposures to cyclohexanone (108941), acetic acid (64197), and methyl 2-cyanoacrylate (137053) (Eastman 910) in the Fabrication Department, Plastics and Synthetics Division of the Norton Company (SIC-3079) in Akron, Ohio. The evaluation was requested by an authorized representative of the United Rubber Workers, Local 731, on behalf of approximately 37 affected employees. Time weighted average (TWA) concentrations of cyclohexanone ranged from 2 to 4 parts per million (ppm), which was below the 50ppm OSHA standard. All samples for acetic acid and methyl 2-cyanoacrylate were below detection limits. The author concludes that employee exposures are within acceptable limits, although the potential for an occasional short duration overexposure to cyclohexanone does exist, and recommends that the dilution ventilation system in the fabrication room be redesigned and improved, clean rags be used to mop up spills and placed in closed containers, liquid transfers be performed in well ventilated areas, all symptoms from exposures be immediately reported to supervisors, and supervisors be knowledgeable of the proper handling of accidental skin bonds.

PB81-143869 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-24-525, United Parcel Service, Latham, New York,
R. M. Taft. Sep 78, 16p NIOSH-HE-78-24-525

Employee exposures to total and respirable nuisance dust were determined on February 22 and 23, 1978 at United Parcel Service (SIC-7331) in Latham, New York. The Chief Steward of the International Brotherhood of Teamsters Local 294 requested the evaluation of behalf of approximately eight affected employees. Some workers completed a nondirected medical questionnaire. Environmental total and respirable dust concentrations were well below the respective OSHA standards of 15 and 5 milligrams per cubic meter. One worker on the red conveyor belt reported symptoms consisted with the presence of an irritant agent, and the two NIOSH investigators experienced eye and upper respiratory irritations when in this area of the facility. The author concludes that no dust hazard existed at the time of the survey, and suggests that the irritation symptoms may be due to sulfur dioxide. The sulfur content of the fuel oil used at the facility should be determined.

PB81-143877 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-15-524, C F and I Steel, Pueblo, Colorado,
B. J. Gunter. Sep 78, 11p NIOSH-HE-78-15-524

Exposures to iron ore dust (15438310), lead (7439921), crystalline silica (14808607), and total particulates were evaluated on June 6 to 8, 1978 in the ore handling department at the C. F. and I. Steel Company (SIC-3312) in Pueblo, Colorado. An evaluation request came from the United Steel Workers of America on behalf of approximately 200 affected workers. Concentration of iron ore dust and total particulates in the work environment exceeded the OSHA standards of 10 milligrams per cubic meter (mg/cu m) for each contaminant. Only one of five samples for crystalline silica exceeded the OSHA standard of 10 milligrams per meter divided by the percentage of respirable quartz plus 2. The results of the lead determinations were not included. Workers reported symptoms compatible with excessive exposure to iron ore dust. The author concludes that a health hazard does exist at this company. Recommendations are included for respirator use, workplace hygiene, and improved ventilation.

PB81-143893 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-38-512, Trans World Airlines Corporation, Los Angeles, California,
M. T. Lkawa, H. P. Blejer, and R. M. Solomon. Jul 78, 15p NIOSH-HE-78-38-512

Environmental and medical surveys were conducted on April 3, 4, and 24, 1978, to evaluate worker exposures to the chemicals used at the Trans World Airlines Maintenance Shop (SIC-4582) at the Los Angeles International Airport in Los Angeles, California. The evaluation was requested by an authorized representative of employees of the International Association of Machinists and Aerospace Workers, Lodge Number 1111, on behalf of approximately 80 affected employees. All environmental samples were below evaluation standards. The medical surveys revealed one job related condition, pimples and irritation in nostrils, due to an improperly fitted respirator. The authors conclude that a potential hazard exists due to sporadic and short term exposures to a variety of chemicals. They recommend that the medical program be improved to ensure that worker health is adequately monitored and that the respirator program be improved and updated.

PB81-143901 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-56-511, Westclox-Division of General Time Corp., Peru, Illinois,
R. S. Kromkowski. Jul 78, 8p NIOSH-HE-78-56-511

Environmental and medical surveys were conducted on March 27, 1978, to investigate exposure to trichloroethylene (79016) from a degreasing operation in the Fuse Subassembly Department 627 of the Westclox Division of General Time Corporation (SIC-3873), in Peru, Illinois. The investigation was requested by an athorized representative of United Steelworkers of America Union Local 12573 on behalf of 54 affected employees and was prompted by an incident in which a mechanical failure caused at least four persons to be overcome by trichloroethylene fumes. All samples analyzed were below the evaluation criteria. The author concludes that employees were not exposed to toxic concentrations of airborne contaminants. The author recommends that exposures be avoided by proper maintenance, modification and operation of existing equipment and by the education of employees and supervisors regarding the potential hazards of trichloroethylene.

PB81-143919 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-53-510, Yarter-Tek Corporation, Denver, Colorado,
B. J. Gunter. Jul 78, 9p NIOSH-HE-78-53-510

Environmental and medical surveys were conducted on May 3 and 12, 1978, to evaluate exposures associated with the use of a silver cyanide (CAS 506-64-9) electroplating solution at the Yarter-Tek Corporation (SIC 281) in Denver, Colorado. The evaluation was requested by the owner of the company on behalf of six affected employees. Cyanide concentrations were below the laboratory detection limit of 0.001 milligrams per sample. Two general room samples for silver were below the laboratory limit of detection of 0.002 milligrams per sample. One silver breathing air zone sample was 0.04 milligrams per cubic meter (mg/cu m) which exceeded the OSHA criterion of 0.01mg/cu m. The author concludes that a health hazard did not exist at the time of the evaluation. The electroplating solution should be kept free of organic debris, all workers should be informed of the hazards of working with cyanide and silver, and workers should not use the electroplating solution unless they are familiar with its operation.

PB81-143927 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-37-509, Franklin Institute, Philadelphia, Pennsylvania,
R. J. Costello, and S. Mitchell. Jul 78, 12p NIOSH-HE-78-37-509

Environmental and medical surveys were conducted on February 6 and 7, 1978 to evaluate the potential hazard associated with employee exposure to an unknown substance in the Solar Energy Demonstration Van belonging to The Franklin Institute Research Labs (SIC-8922) in Philadelphia, Pennsylvania. The evaluation was requested by the employer of two affected employees. The concentrations of airborne contaminants measured during the survey were below the accepted criteria for occupational exposures. The authors conclude that the illnesses experienced by the employees could not be attributed to an occupational exposure to a toxic substance.

PB81-143935 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-75-508, Cal West Periodicals, Oakland, California,
M. T. Okawa. Jul 78, 7p NIOSH-HE-78-75-508

Environmental and medical surveys were conducted on April 20 and 27, 1978 to investigate the possible toxic effects of a coding tape used at the Cal

West Periodicals Company (SIC-5199) in Oakland California. The investigation was requested by an authorized representative of employees of Local 29 of the Office and Professional Employees Union. Alkane concentrations in general area and breathing zone samples ranged from 3.0 to 3.8 milligrams per cubic meter. Medical evaluations revealed no symptoms related to exposure to the tape. The author concludes that the exposures of employees to the coding tape is not toxic. Management should monitor employee complaints of symptoms related to the use of the coding tape.

PB81-143943 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-32-507, Chalfant Manufacturing Company, 1000 W. River Road, Elyria, Ohio,
W. A. Evans, and J. Lybarger. Jul 78, 22p NIOSH-HE-78-32-507

Environmental and medical surveys were conducted on December 21, 1977, and March 28 and 29, 1978 to investigate illnesses among employees from the welding and painting operations at Chalfant Manufacturing Company (SIC-3443) in Elyria, Ohio. The evaluation was requested by an authorized employee representative of the Upholsterer's Union Local 48 on behalf of the approximately 11 affected employees. Samples analyzed for zinc oxide (1314132), aluminum (7429905), iron oxide (1309371), cadmium (7440439), xylene (1330207), acetone (67641), and beryllium (7440417) were below evaluation criteria. Copper (7440508) fume concentrations ranged from 0.1 to 1.5 milligrams per cubic meter (mg/cu m), exceeding the OSHA standard of 0.1mg/cu m, and total dust concentrations ranged from 12.4 to 18.2mg/cu m, exceeding the OSHA standard of 15mg/cu m. Ozone concentrations ranged from 0.005 to 1.0 parts per million (ppm) during welding, exceeding the OSHA standard of 0.1ppm. Interviewed workers reported work associated symptoms, with worse symptoms when the welding process involved galvanized steel. The authors conclude that a health hazard exists for the welders, and spray painters may have been exposed to excessive solvent vapors when painting in poorly ventilated areas. They recommend that local exhaust ventilation be installed in all welding locations and that welding curtains be installed to protect other workers from flash burns.

PB81-143950 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-33-506, Grand Junction Steel Fabricating Company, Grand Junction, Colorado,
B. J. Gunter. Jul 78, 13p NIOSH-HE-78-33-506

Environmental and medical surveys were conducted from January 30, to February 2, 1978 to evaluate exposures associated with the welding of sheet and angle iron at Grand Junction Steel Fabricating Company (SIC-3441) in Grand Junction, Colorado. The evaluation was requested by the local United Steelworkers of America Union on behalf of approximately 100 affected workers. Environmental samples showed that workers were overexposed to iron oxide (1309371) fumes; concentrations exceeded the recommended threshold limit value of 5.0 milligrams per cubic meter. All other environmental measurements were within the most recent evaluation criteria. Medical interviews of 32 revealed showed that welders had complaints that were compatible with overexposure to welding fumes. The author concludes that a potential health hazard existed at the time of the survey. Local ventilation should be provided to reduce welding fume exposures, the respirator used in the paint booth area should be cleaned and maintained, and eating should be prohibited in the work area.

PB81-143968 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-30-519, Radio Station WSNY, Rounsaville of Jacksonville, Inc., Jacksonville, Florida,
M. Singal, and J. R. Kominsky. Aug 78, 24p NIOSH-HE-78-30-519

Environmental and medical surveys were conducted on January 4 and 5, 1978, at Radio Station WSNY (SIC-3441) in Jacksonville, Florida to evaluate potential health hazards caused by emissions from a neighboring chemical facility. The evaluation was requested by an authorized employee representative from the radio station on behalf of approximately 24 affected employees. Environmental air samples contained concentrations of organics that were below the OSHA standards. A majority of neighborhood residents and radio station employees complained of symptoms they associated with emissions from the facility, with radio station employees attributing more serious health effects to the emissions. The authors conclude that there are noxious odors in the vicinity of the radio station and that irritative and nonspecific symptoms are associated with the odors. However there is no evidence indicating that serious adverse health effects could be associated with the exposures. They suggest that neighborhood residents and businesses be surveyed after the installation of an afterburner at the chemical facility to determine if the incidence of emission related symptoms is decreased.

PB81-143976 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 77-92-541, Packard Electric, Division of General Motors Corporation, Warren, Ohio,
J. H. Price. Nov 78, 33p NIOSH-HE-77-92-541

Employee exposures to thermal decomposition products from injection and extrusion molding of thermoplastics were evaluated on November 14 to 16, 1977, at Packard Electric, Division of General Motors Corporation (Standard Industrial Classification-3079), Warren, Ohio. An evaluation request came from an authorized representative of employees on behalf of approximately 200 affected workers. About 25 percent of the workers interviewed reported respiratory and eye irritations, headache and nausea. Thermogravimetric analyses showed that all samples began to lose weight at approximately 250 degrees C and by 900 degrees C, all samples had lost at least 83 percent of their initial weight. Excluding benzene (71432), concentrations of airborne contaminants were well below applicable OSHA standards. Measurements of significant benzene concentrations were attributed to interference in testing. The author concludes that workers are not exposed to hazardous chemical concentrations. Proper temperature and hold times should be maintained and adequate ventilation should be provided. Employees should be removed from the work area in the event of press overheating. Hot plastic scrap should be properly disposed of, and decomposition data should be obtained for the acrylic purging compound.

PB81-143984 PC **A03**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 76-55-443, Certain-Teed Products, Inc., Tacoma, Washington,
A. G. Apol, and M. Okawa. Nov 77, 34p NIOSH-HE-76-55-443

Toxic exposures were investigated at Certain-Teed Products, Incorporated, in Tacoma, Washington on October 12 and 13, 1976. The request was received from the United Paperworkers International Union, Flushing, New York. The potential toxic materials included asphalt fume, aromatic and aliphatic hydrocarbons, carbon monoxide (630080), fibrous glass, formaldehyde (50000), silica (7631869), alpha and beta-naphthylamine (134327) (91598), and benzo(a)pyrene (50328). Area and personal air samples were collected from all job sites and 15 workers were examined and interviewed. Toxic exposures were experienced by the dry felt man, two coater men, a coater trainee, a slate man, and a press operator who were exposed to concentrations of asphalt fumes and total dust in excess of recommended standards. Eye irritations and mild to severe conjunctival redness were experienced by some of the workers. No other exposures were toxic, although irritations to nose, throat, and skin were noted at fibrous glass and formaldehyde operations. Carbon monoxide data was incomplete. Recommendations for improved health and safety include provision of exhaust ventilation, respirator use for some tasks, repair of leaking equipment, dust abatement, use of protective clothing, medical care and monitoring, and other engineering and personal control measures.

PB81-148041 PC **A02**/MF **A01**
Syracuse Research Corp., NY. Center for Chemical Hazard Assessment.
Information Profiles on Potential Occupational Hazards. Volume II. Chemical Classes. Polypropylene Glycols.
Final rept.
Dec 79, 16p
Contract PHS-NIOSH-210-78-0019

This information profile on polypropylene glycols is part of a group of 46 such profiles that provide information about chemicals or industrial processes considered to be potential occupational hazards. Each profile contains summary data on known and suspected health effects, the extent of worker exposure and the industrial importance of either a single chemical, class of chemicals, or a particular industrial process. The report was developed for use by occupational safety and health professionals in industry, and labor and other areas, to provide them with a synopsis of information on each subject and to identify potential hazards in their workplaces.

PB81-149684 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-3-555, Warminster Fiberglass, Southampton, Pennsylvania,
R. E. Rosensteel. Jan 79, 23p NIOSH-HE-78-3-555

Environmental surveys and employee interviews were conducted on November 14 and 15, 1977, and July 24 to 28, 1978, to evaluate complaints of irritating fumes causing eye, nose, throat, and skin irritations to fiberglass assemblers at Warminster Fiberglass (SIC-3296) in Southampton, Pennsylvania. The evauation was requested by the employer on behalf of approximately 80 affected employees. Styrene (100425) concentrations during the initial survey ranged from 200 to 400 parts per million (ppm), exceeding the 100 ppm OSHA standard. Reported employee symptoms were consistent with symptoms caused by styrene overexposure. Methylethyl ketone peroxide (MEKO) concentrations ranged from none detected to 13 milligrams per cubic meter (mg/cu m), exceeding the 1.5mg/cu m American Conference of Governmental Industrial Hygienists Threshold Limit Value as measured during spray up fabrication. Peak levels of styrene exceeded the 600ppm OSHA standard for peak measurements in two instances. The 200ppm OSHA ceiling for 5 minute exposure was equalled in one sample. The author concludes that workers were exposed to potentially toxic concentrations of MEKO and styrene vapor and less significant concentrations of acetone vapors. The author recommends that one of the ventilation systems be improved, that the practice of removing dust using compressed air be discontinued and replaced with a vacuum system, and that two work stations be relocated so as to be directly in front of the exhaust hoods.

PB81-149692 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-101-556, Cambridge University Press, 510 North Avenue, New Rochelle, New York,
J. Messite, and N. Fannick. Jan 79, 9p NIOSH-HE-78-101-556

Environmental and medical surveys were conducted on July 12 and September 11, 1978, to determine employee exposure to benzene (CAS 71-43-2) in the print shop at Cambridge University Press (SIC-2731) in New Rochelle, New York. The evaluation was requested by a company representative on behalf of three affected employees. Environmental benzene concentrations ranged from none detected to 1.54 milligrams per cubic meter (mg/cu m), well below the OSHA standard of 32mg/cu m. The authors conclude that the workers were not exposed to excessive concentrations of benzene in the print shop. The authors recommend that one worker with pancytopenia not be allowed to work in areas where benzene is used until after a medical follow up and a determination of his hematological status.

PB81-149700 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. 78-42-498, Swedish Hospital, Seattle, Washington,
A. Apol. May 78, 10p NIOSH-HE-78-42-498

Employee exposure to ethylene oxide (75218) (ETO) and dichlorodifluoromethane (75718) (Freon-12) were evaluated on March 6 and 7, 1978 in the anesthesia equipment room of Swedish Hospital (SIC-801) in Seattle, Washington. An evaluation request came from the hospital administration on behalf of approximately 24 affected workers. Two 15 minute breathing zone samples of ETO were 28 and 57 parts per million (ppm), respectively. Two general area samples were 41 and 37ppm respectively. The time weighted average exposure was approximately 10 to 15ppm. These were below the evaluation criteria of 75ppm for 15 minute periods. Freon-12 gas concentrations calculated on a ratio basis were well below the criteria of 1,000ppm. The authors conclude that there is no hazard from exposure to ETO or Freon-12. They recommend increasing ventilation, closing the cabinet door and opening the sterilizer door, and restricting entrance to the ETO area, medical surveillance preplacement examinations, counselling, and periodic medical examinations.

PB81-149726 PC **A02**/MF **A01**
National Inst. for Occupational Safety and Health, Cincinnati, OH. Health Hazard and Technical Assistance Branch.
Health Hazard Evaluation Determination Report No. HE 78-99-562, Grumman Flexible, Loudonville, Ohio,
R. Taft. Feb 79, 11p NIOSH-HE-78-99-562

Employee exposures to ammonia (7664417) in the Blueprint Reproduction Department of Grumman Flexible (SIC-3743) in Loudonville, Ohio were evaluated on August 2, 1978. The evaluation was requested by the safety committee representative of Local 4781, United Steelworkers of America on behalf of seven potentially exposed employees. Amounts of ammonia detected ranged from 0.8 to 3.3 parts per million (ppm) for a time-weighted average (TWA). These values were far below the OSHA standard of 50ppm for an 8 hour TWA. Private interviews with employees revealed no adverse health effects from ammonia exposure. The investigator concludes that a health hazard to employees did not exist in the reproduction department. He recommends that ammonia be stored in a proper place away from eating areas, gloves and goggles be worn when handling ammonia, and ammonia containers be properly labeled. Recommendations for controlling ammonia exposure and other workplace hazards in other departments of the company also were given.

6K. Life Support

AD-A094 132/8 PC **A03**/MF **A01**
Navy Experimental Diving Unit, Panama City, FL.
Respiratory Heat Loss Limits in Helium-Oxygen Saturation Diving.
Final rept.,
C. A. Piantadosi. Jun 80, 30p Rept no. NEDU-10-80
Errata sheet inserted.

Convective respiratory heat transfer in divers breathing cold helium-oxygen is a major avenue of body heat loss for which there is no effective thermoregulatory compensation. Review of recent studies of hyperbaric respiratory heat loss provides a physiological data base for updating current minimum inspired gas temperatures for saturation diving. The new proposed inspired gas temperature-depth curve is based upon a maximum convective respiratory heat loss of 20 W/sq m for a resting diver maintaining thermoneutral skin temperature in a hot water suit. This level of respiratory heat loss is predicted to allow an average rectal temperature drop of 0.25 C per hour, and will support a four hour mission. The new limits are designed to allow divers with any ventilatory response to exercise or cold to gain heat from exercise, although it is expected that most of the exercise heat remaining after obligatory increases in respiratory heat loss from the ventilatory response to the exercise, will be dissipated through the diver's skin as he adjusts his hot water flow and temperature for comfort. (Author)

PATENT-4 236 546 Not available NTIS
Department of the Navy, Washington, DC.
Electronic Breathing Mixture Control.
Patent,
Claude E. Manley, John J. Pennella, Donald J. Deaton, Alan L. Crandall, and James P. Hersey.
Filed 23 Oct 78, patented 2 Dec 80, 9p AD-D008 039/0, PAT-APPL-953 510
Supersedes PAT-APPL-953 510-78, AD-D006 806.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An electronic breathing mixture control system which senses and controls the oxygen component partial pressure of an underwater breathing mixture. Three oxygen sensors disposed within a mix chamber generate voltages proportional to the oxygen partial pressure in the mixture. These voltages are processed and compared with reference voltages using digital logic circuitry. The resulting processed signals control two light emitting diodes warning the user of improper oxygen partial pressure and in addition control a switch that actuates an oxygen valve which either restricts oxygen flow to the mix chamber or allows more oxygen to flow therein.

6L. Medical and Hospital Equipment

AD-A094 274/8 PC **A02**/MF **A01**
Jefferson Medical Coll., Philadelphia, PA.
The Development and Application of a Tendon Prosthesis for the Early Functional Restoration of the Hand.
Annual rept. (Final) 1 Jul 71-31 May 79,
James M. Hunter, Scott H. Jaeger, and John J. Konikoff. Mar 80, 16p
Contracts DADA17-71-C-1112, DAMD17-76-C-6036

The primary goal of this program was the development of an active hand tendon prosthesis. During the past 6 months (December 78 thru 31 May 1979) the several aspects of this investigation resulted in a prototype design of an active artificial tendon (AAT) that appears to meet this goal. The final design of the AAT encompasses a polyester shaft having a looped proximal end and a sintered titanium plug permanently attached to the distal end for attachment to bone. The entire device, with the exception of the 3mm. long sintered plug, is coated with silastic (silicon rubber) to enhance its gliding ability which is a requisite criterion needed to reduce the probability for the promotion of adhesions following implantation surgery. In addition, the silastic coating is essentially benign within the milieu of the anatomic locus of the hand/finger thus eliminating any potential interaction. Long term implant experience is not as yet available due to the non-renewal of the study contract. However, short-term implant studies in both primates and humans have shown promise. (Author)

PATENT-4 219 027 Not available NTIS
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Subcutaneous Electrode Structure.
Patent,
G. F. Lund. Filed 16 Jan 79, patented 26 Aug 80, 5p N81-14612/8, PAT-APPL-6-003 693
Supersedes PAT-APPL-6-003 693, N79-15576 (17-06, p 0765). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A subcutaneous electrode structure suitable for a chronic implant and for taking a low noise electrocardiogram of an active animal, comprises a thin inflexible, smooth disc of stainless steel having a diameter as of 5 to 30 mm, which is sutured in place to the animal being monitored. The disc electrode includes a radially directed slot extending in from the periphery of the disc for approximately 1/3 of the diameter. Electrical connection is made to the disc by means of a flexible lead wire that extends longitudinally of the slot and is woven through apertures in the disc and held at the terminal end by means of a spot welded tab. Within the slot, an electrically insulative sleeve, such as silicone rubber, is placed over the wire. The wire with the sleeve mounted thereon is captured in the plane of the disc and within the slot by means of crimping tabs extending laterally of the slot and over the insulative wire. The marginal lip of the slot area is apertured and an electrically insulative potting material such as silicone rubber, is potted in place overlaying the wire slot region and through the apertures.

PATENT-4 244 787 Not available NTIS
Department of Health, Education, and Welfare, Washington, DC.
Apparatus and Method for Determining Serum Concentrates of Metabolites by Monitoring Dialysate Fluid.
Patent,
Elias Klein, and Ronald L. Wathen. Filed 11 Jun 79, patented 13 Jan 81, 9p PB81-152738, PAT-APPL-6-047 786
Supersedes PB-300 940.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is an apparatus and method are disclosed for monitoring, analyzing and quantitating in real time the concentrations of metabolites in serum by analyzing the dialysate solutions which are being equilibrated with the blood via a hemodialyzer. Thus, access to certain metabolically important species is provided without the necessity of blood sampling. The apparatus includes at least one ion-selective electrode coupled with the dialysate effluent stream, and the electrode EMF is converted to dialysate concentrations based on precalibration. The dialysate concentrations, in turn, are related to serum levels by factors governing mass transfer through the dialyzer.

PB81-149627 PC **A03**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Diagnostic Ultrasound Reporting Guide (21 CFR 1002.10).
Nov 80, 32p FDA/BRH-81/17, DHHS/PUB/FDA-81-8145

This guide is to be used by manufacturers of medical diagnostic ultrasound equipment in the preparation of initial and model change reports to be filed with the Bureau of Radiological Health, as required by 21 CFR 1002.10 and 1002.12, issued under authority of the Radiation Control for Health and Safety Act of 1968. These reports will be used by BRH staff to assess the performance and radiation safety aspects of the products. Any questions regarding this guide should be directed to the Bureau's Division of Compliance.

6M. Microbiology:

PB81-856098 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lactic Acid Bacteria. January, 1978-November, 1980 (Citations from the Information Retrieval, Ltd. Data Base).
Rept. for Jan 78-Nov 80.
Dec 80, 239p NERACIRLNT1341
Sponsored by National Technical Information Service, Springfield, VA.

The articles cited in this bibliography cover the diverse aspects of lactic acid bacteria. Reported are such areas as the use of lactic acid bacteria in, all varieties of fermented or cultured products, the production of animal feed stuffs, dietary supplements, + dextrans. Also covered are the detection + identification of lactic acid bacteria contaminants + the stabilization of cultures. (Contains 225 citations, fully indexed and including a table of contents.)

PB81-929700 Standing Order
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Cancer Virology.
Special listings.
1981, approx. 5 issues
Paper copy available on Standing Order, Deposit Account required. North American Continent price $2.00/each issue; all others write for quote. Single copies also available in paper or microfiche.

The Special Listing of Current Cancer Research Projects is a publication of the International Cancer Research Data Bank (ICRDB) program of the National Cancer Institute. Each Listing contains descriptions of ongoing projects in one selected cancer research area. The research areas include: Replication, synthesis, and related studies of DNA tumor viruses; Genetics of DNA tumor viruses; Broad programs on the replication and genetics of DNA tumor viruses; Other studies on the replication and genetics of DNA tumor viruses.

PB81-929701 PC**$5.25**/MF**$3.00**
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Genetics and Molecular Biology of DNA Tumor Viruses.
Special listing.
Jan 81, 72p NCI/ICRDB/SL-420
Supersedes PB80-929701.

The research areas include: Herpesviruses; Papovaviruses; Adenovirus; Other DNA tumor viruses.

PB81-930300 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Virus Studies in Humans and Other Primates.
Cancergram CB04.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

No abstract available.

PB81-931600 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
RNA Viruses Associated with Cancer: Cell Biology and Animal Studies.
Cancergram CB22.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

All aspects of the biology of certain RNA viruses at the cellular or animal level will be covered in this Cancergram. The scope encompasses all RNA viruses, including those infecting human tissues, which have established or potential significance in cancer etiology. Emphasis is placed on cell-virus interactions including host alteration, transformation, and other virally induced morphological changes, as well as studies of viral genetics, replication, and expression. Molecular aspects of viral cancer biology are covered by Cancergram CB23, entitled RNA Viruses Associated with Cancer--Molecular Biology.

6N. Personnel Selection and Maintenance (Medical)

AD-A094 395/1 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Biomechanics.
A Foundation for Systems Anthropometry.
Final rept.,
Herbert M. Reynolds, Jeff Marcus, James Freeman, and Laurie Batzer. 25 Nov 80, 21p
AFOSR-TR-81-0086
Contract F49620-78-C-0012

System Anthropometry has laid the foundation for a three-dimensional anthropometry. A unique, dedicated laboratory has been built and is currently used in an investigation of the lumbar/pelvic/femur linkage system. Data have been analyzed describing the three-dimensional seated posture of 281 young female subjects. Through the use of a multivariant clustering procedure, two postures were identified: slouched and erect. Data have been collected and analyzed on the sacroiliac and hip joint motion in three-dimensional space. Thus, the basis for describing in three-dimensional space a fixed body posture and for obtaining data on joint mobility (the anatomical site at which a change of posture is made) has been established. (Author)

AD-A094 518/8 PC **A02**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
A System for Establishing Occupationally-Related Gender-Free Physical Fitness Standards,
James A. Vogel, James E. Wright, John F. Patton, III , James Dawson, and Mary Pat Eschenback. Apr 80, 25p Rept no. USARIEM-T-5/80

The Army's desire to utilize greater numbers of women in physically demanding, non-traditional occupations has created the need to match individual capacities with occupational demands. Research has been conducted to develop a process by which objectively determined physical demands of MOSs can be converted into gender-free physical fitness standards. These standards could then be used both for MOS assignment qualification as well as assuring maintenance of fitness commensurate with job demands. The process was initiated by compiling individual task lists from which cluster of MOSs were formed of those with similar physical demands. The most demanding MOS tasks within each cluster were then measured for their actual physiological cost, force required and/or energy expended, with these costs then being converted into equivalent physiological capacities. These capacities were express in terms of muscle strength and aerobic power (stamina) which can be assessed at the time of entrance into the service as well as during periodic on-the-job evaluations. This research has resulted in the derivation of five sets of standards, encompassing three levels of demand within two categories of fitness (strength and stamina). The process describes a system by which physically demanding occupations can be assigned on a gender-free basis which will be scientifically defensible. (Author)

6O. Pharmacology

AD-A094 316/7 Not available NTIS
Eastern Virginia Medical School, Norfolk. Dept. of Physiology and Bioengineering.
Acute Heroin Abstinence in Man. III. Effect Upon Waking and Slow Wave Sleep,
Richard C. Howe, Jerry L. Phillips, and Frederick W. Hegge. 20 May 80, 16p
Contract DAMD17-75-C-5030, Grant PHS-DA-01613
See also AD-A090 233.
Availability: Pub. in Drug and Alcohol Dependence, v6 p247-262 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 447/0 PC **A04**/MF **A01**
Defence Research Establishment Ottawa (Ontario).
Search for Radioprotective Compounds. Part XVIII. Synthesis and Protective Activity of a Series of S-Omega(Omega-(Omega-Aminoalkylamino) Alkylamino) Alkylphosphorothioic Acids and Disulphides,
G. A. Grant, W. Sowa, B. A. Licht, and K. Leach. Oct 80, 64p Rept no. DREO-R-826
Abstract in French. See also Part 17, AD-B014 236.

The synthesis of the polyamines phosphorothioic acids NH2(CH2)n''NH(CH2)n'NH(CH2)nSPO3H were achieved where n = 2 and 3, n' = 2, 3, 4 and 5; n'' = 2, 3, 4. The toxicities and radiation dose reduction factors (DRF) were determined in mice. The compounds were given intraperitoneally before irradiation. The mice were irradiated with Cs134 gamma radiation source at dose rate of approximately 90 r/min. The best DRF (1.8) was obtained for the compounds with n = n' = n'' = 2 and when n = n'' = 2 and n' = 3. The toxicity increased and protective activity decreased when the number of carbon atoms in the alkyl chains was increased. The preparation of pure thiol derivatives was not totally successful. The one impure thiol compound when n = n' = n'' = 2 obtained had a DRF of 1.41. The disulfide derivatives were prepared but were more toxic and less protective than the parent compounds. The compounds were not protective when given orally or after irradiation. The relationship between chemical structure and radiation protective activity is discussed. (Author)

PATENT-4 230 717 Not available NTIS
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Indometh Acin-Antihistamine Combination for Gastric Ulceration Control.
Patent,
P. A. Brown, and J. Vernikos. Filed 29 Dec 78, patented 28 Oct 80, 8p N81-14613/6, PAT-APPL-974 476
Supersedes PAT-APPL-974 476-78, N79-14755 (17 - 05, p 0646).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An anti-inflammatory and analgesic composition containing indomethacin and an H2 histamine receptor antagonist in an amount sufficient to reduce gastric distress caused by the indomethacin was developed. Usable antagonists are metiamide and cimetidine.

PATENT-4 239 744 Not available NTIS
Department of Health and Human Services, Washington, DC.
Patent,
Patent,
Steven M. Paul, and Phil Skolnick. Filed 10 Oct 78, patented 16 Dec 80, 6p PB81-152720, PAT-APPL-949 689
Supersedes PB-291 360.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention is a rapid and sensitive radioreceptor assay for measuring benzodiazepines in plasma and other biological specimens is described. This method is based on the competition between (3H) diazepam or tritiated flunitrazepam and pharmacologically active benzodiazepines present in plasma, for binding sites on rat brain synaptosomal membranes. No interference is obtained with drug-free plasma or plasma samples containing high concentrations of other commonly used drugs.

PATENT-4 242 502 Not available NTIS
Department of Health and Human Services, Washington, DC.
Enhancement of Cholesterol Combining Properties of Saponins.
Patent,
Manuel R. Malinow, Phyllis A. McLaughlin, George O. Kohler, and Arvin L. Livingston. Filed 20 Apr 79, patented 30 Dec 80, 5p PB81-152746, PAT-APPL-6-031 970
Supersedes PB-301 026.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing.

Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The present invention relates to the use of Saponins to inhibit cholesterol absorption. More particularly, the present invention relates to the enhancement of the cholesterol combining properties of saponins, by acid hydrolysis of the saponins under mild conditions.

PB81-149759 PC **A17**/MF **A01**
IMS America Ltd., Ambler, PA.
An Experiment in Early Post-Marketing Surveillance of Drugs. Final Report - Task C.
Rept. for May 79-Sep 80.
30 Sep 80, 387p FDA/BD-81/30
Contract PHS-FDA-223-78-3007
Sponsored in part by Department of Commerce, Washington, DC.

The principal focus of Task C is the visualization of a comprehensive national postmarketing surveillance (PMS) system and recommendations for the methodologic elements needed for its operation. The concerns of PMS are discovery of adverse effects unsuspected at the time of marketing, quantification of suspected or known adverse effects, quantification of efficacy and the discovery of new indications.

6P. Physiology

AD-A094 106/2 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
Relation of Frequency-Analyzed EEG to Monitoring Behavior,
Richard E. Townsend, and Laverne C. Johnson.
27 Dec 78, 11p Rept no. NAVHLTHRSCHC-78-32
Pub. in Electroencephalography and Clinical Neurophysiology, v47 p272-279 1979.

No abstract available.

AD-A094 148/4 PC **A04**/MF **A01**
Letterman Army Inst. of Research, San Francisco, CA.
Influence of Nutritional Factors on Lipid Metabolism.
Final rept.,
E. Wayne Askew. Dec 80, 53p Rept no. LAIR-89

Modification of the composition of the diet can cause alterations in the enzyme activities of different tissues and organs. Changes in enzyme activity in response to diet are part of the process of metabolic regulation enabling a biological system to function efficiently and harmoniously. Lipid metabolism is closely coordinated with the diet because lipids are repositories for excess energy and a source of energy during periods of deprivation. The effect of diet on lipid metabolism in the liver, muscle, and adipose tissue frequently differs and is species dependent. Fatty acid uptake, synthesis, esterification, mobilization, and oxidation are coordinated metabolic processes that are under dietary control. (Author)

AD-A094 191/4 PC **A02**/MF **A01**
Naval Health Research Center, San Diego, CA.
An Attempted Validation Study of the Birthdate Based Biorhythm (BBB) Hypothesis,
C. E. Englund, and P. Naitoh. 1980, 10p Rept no. NAVHLTHRSCHC-77-52
Pub. in Aviation, Space, and Environmental Medicine, v51 n6 p583-590 Jun 80. Supersedes report dated Dec 77, AD-A070 829.

No abstract available.

AD-A094 245/8 PC **A02**/MF **A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
Stimulation Studies in the Descending Auditory Pathway.
Final rept.,
John F. Glenn, and Lynn C. Oatman. 24 Apr 80, 7p Rept no. HEL-TM-23-80
Pub. in Brain Research, v196 p258-261 1980.

No abstract available.

AD-A094 416/5 PC **A03**/MF **A01**
Susquehanna Resources and Environment, Inc., Johnson City, NY.
Comparative Evaluations of the RADC/Hsu Texture Measurement System with Perceptual Analyses.
Final rept.,
Shin-yi Hsu, and Richard G. Burright. Oct 80, 50p AFOSR-TR-81-0079
Contract F49620-79-C-0009

Aspects of the enormously important pattern recognition problem were examined. Real-world, digitized-image information from high and low resolution aerial photographs of different and similar terrain-types was used. We compared human judgments of overall visual differences among chloropleth representations with computer solutions based on the RADC/Hsu system. The work has resulted in new methodological and theoretical perspectives (including Master's scaling technique) which provide means for better defining and understanding both human and computer information handling systems when highly complex, remotely-sensed, real-world data are involved. (Author)

6Q. Protective Equipment

PB81-135337 PC **A07**/MF **A01**
South Dakota Univ., Vermillion. Human Factors Lab.
Impact of Motorcycle Helmet Law Repeal in South Dakota 1976-79.
Final rept. Jul 76-Mar 80,
Cynthia Struckman-Johnson, and V. S. Ellingstad. Jun 80, 128p HFL-80-1, DOT-HS-805 619
Contract DOT-HS-9-02130

The present report in two volumes assesses changes in levels of helmet use, state-wide accident experience, and incidence of cyclist injury between a pre-repeal period and two post-repeal years. Results of three state-wide surveys, each of which included observations of over 12,000 cyclists, showed helmet use to decline from nearly 100% in the pre-repeal period to 57% in 1977 and 48% in 1978. Data from 1,515 motorcycle accidents occurring between July 1976 and June 1979 were examined to assess the influence of helmet law repeal on incidence and severity of victim injuries. Accident cost data were also obtained for a random sample of 136 motorcycle drivers involved in these accidents. Helmet use was clearly related to the severity of victims' injuries and to the incidence of head trauma.

PB81-135345 PC **A03**/MF **A01**
South Dakota Univ., Vermillion. Human Factors Lab.
Impact of Motorcycle Helmet Law Repeal in South Dakota 1976-79: Executive Summary.
Final rept. Jul 76-Mar 80,
Cynthia Struckman-Johnson, and V. S. Ellingstad. Jun 80, 30p HFL-80-1, DOT-HS-805 621
Contract DOT-HS-9-02130

The report presents the executive summary on the assesses changes in levels of helmet use, statewide accident experience, and incidence of cyclist injury between a pre-repeal period and two post-repeal years. Results of three state-wide surveys, each of which included observations of over 12,000 cyclists, showed helmet use to decline from nearly 100% in the pre-repeal period to 57% in 1977 and 48% in 1978. Data from 1,515 motorcycle accidents occurring between July 1976 and June 1979 were examined to assess the influence of helmet law repeal on incidence and severity of victim injuries. Helmet use was clearly related to the severity of victims' injuries and to the incidence of head trauma.

PB81-145377 PC **A18**/MF **A01**
Michigan Univ., Ann Arbor. Highway Safety Research Inst.
Simulation Analysis of Head/Neck Impact Response for Helmeted and Unhelmeted Motorcyclists.
Final rept. 22 May 78-18 Apr 80,
Bruce M. Bowman, and Lawrence W. Schneider. 18 Apr 80, 410p UM-HSRI-80-26
Sponsored in part by Insurance Inst. for Highway Safety, Washington, DC.

The purpose of the study was to determine by use of computer simulations both quantitative and qualitative measures of the effectiveness of motorcycle helmets in reducing head and neck injuries in motorcyclist impacts. The computer model used was the MVMA Two-Dimensional Crash Victim Simulation. The study investigated a wide variety of impact conditions in order to establish a broad overall view of the effectiveness of helmet use. The potential of the helmet to both beneficially and detrimentally affect head and neck response was examined. It was found that helmet use invariably lessens the exposure levels of dynamic responses which have a role in producing head injury. In addition, the study finds helmet use to almost always reduce the severity of neck response as well and for no simulation configuration or condition to greatly increase the likelihood of neck injury. Thus, in the spectrum of realworld motorcyclist impacts, helmet use is predicted to significantly reduce the overall likelihood and severity of both head and neck injuries.

6R. Radiobiology

BNL-28487 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Desferal (DFO) Induced Ga-67 Washout from Normal Tissue, Tumor and Abscess in Experimental Animals.
Z. H. Oster, P. Som, H. L. Atkins, and A. B. Brill. 1980, 12p CONF-801082-3
Contract AC02-76CH00016
ORAU radiopharmaceutical dosimetry symposium, Oak Ridge, TN, USA, 6 Oct 1980.

In the experimental animal, desferal (DFO) given intravenously washes out Ga-67 from all tissues. This effect is not uniform: blood activity is reduced very markedly, while liver activity is less affected. Maximal effect of DFO occurs if given close to the Ga-67 injection. When the time interval between the two is increased, the absolute amount of Ga-67 excreted in the urine in excess of the spontaneous excretion is reduced. Administration of DFO does not effect Ga-67 gastrointestinal excretion. In three animal tumor models (EMT-6 sarcoma in Balb/c mice, spontaneous adenocarcinoma in mice, and spontaneous adenocarcinoma in the rabbit) and in sterile abscess-bearing rats, the administration of DFO 24 hrs after Ga-67-citrate improves significantly the target-to-nontarget ratio. Animals given 50 mg/kg DFO I.V. after Ga-67 citrate showed a significant reduction in the whole-body activity as seen in a one-week follow up. (ERA citation 06:004209)

COO-3380-33 PC **A03**/MF **A01**
New York Univ., NY. Dept. of Environmental Medicine.
Oncogenic Action of beta, Proton, alpha and Electron Radiation on the Rat Skin.
F. J. Burns. 1980, 29p
Contract AS02-76EV03380

Rat skin is being utilized as an empirical model for testing dose and time related aspects of the oncogenic action of ionizing radiation, ultraviolet light, and polycyclic aromatic hydrocarbons. Molecular lesions in the skin DNA, including, strand breaks and thymine dimers, are being measured and compared to tumor induction. The induction and repair kinetics of molcular lesions are being compared to split dose repair. Modifiers and radiosensitizers are being utilized to test specific aspects of a chromosome breakage theory of radiation oncogenesis. (ERA citation 06:004210)

COO-4733-2 PC **A12**/MF **A01**
Columbia Univ., New York. Radiological Research Lab.
Radiation Physics, Biophysics and Radiation Biology. Progress Report, October 1, 1978-September 30, 1979.
Jul 79, 259p
Contract EP-78-S-02-4733

Individual abstracts are included for 27 subprojects in radiological physics, microdosimetry, biophysics and radiobiology. (ERA citation 06:004202)

IAEA-R-1881-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Coordinated Comparative Studies on Radiation Induced Chromosome Aberrations in Mammalian Species Including Man. Part of a Coordinated Programme on Radiation Induced Chromosomal Aberrations for Genetic Risk Evaluation in Man. Final Report for the Period 1 November 1976 - 30 November 1979.
H. G. Schwarzacher. Dec 79, 8p
U.S. Sales Only.

The system of cultured lymphocytes of man is within certain limitations a reliable indicator of radiation damage to human cells. Within the range of 50-300 rad a definite dose-response is to be observed, if the observations are restricted to first division cells. The question of very low doses is not yet cleared and should be further investigated. The limitations are, that a rather high intra-individual variation exists. This may have its origine in the variable potency of lymphocytes responding to antigene stimulus (Phytohemagglutinine) as well as in genetical or conditional individual differences in DNA-damage and repair capacities. It seems to be necessary, to elucidate these variations in further studies. (Atomindex citation 11:531239)

IAEA-R-1885-F PC **A02**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Studies on the Chromosome Aberrations and Isozyme Patterns in Cancer Patients Treated with Therapeutic Radiation. Final Report for the Period 1 November 1976 - 31 March 1979.
J. J. Kim. Sep 79, 15p
U.S. Sales Only.

The chromosome aberration yield of peripheral blood lymphocytes obtained from cancer patients who had been locally irradiated with therapeutic radiation seems to be largely influenced by total dose, loss of cell with aberration, irradiation interval and dose per day. When treatment period from 7 to 21 days and total dose range from 1000 to 3000 rad, the aberration yield is considered to change according to total dose and accumulated effect by continued existence of damaged chromosomes. However, loss of cell with aberration might play important role in chromosome aberration yield of peripheral blood lymphocytes obtained from those who had received radiation above 3000 rad. In case that other conditions make little difference, dose per day and irradiation interval are looked upon as important factors in aberration yield of lymphocyte chromosomes. (Atomindex citation 11:531235)

IAEA-R-2078-F PC **A03**/MF **A01**
International Atomic Energy Agency, Vienna (Austria).
Nuclear-Based Methods for Analysis of Pollutants in Human Hair, Evaluation of the Significance of Elemental Deposition in Hair to Uptake and Distribution in the Body. Part of a Coordinated Programme on Nuclear Based Methods for Analysis of Pollutants in Human Hair. Final Report for the Period 1 October 1977 - 31 September 1979.
W. E. Kollmer. Oct 79, 29p
U.S. Sales Only.

This study attempts to correlate the level in hair of Cd, a major trace pollutant, vis-a-vis the element concentration in internal tissues and organs of experimental rats using the radioisotope tracer technique. In acute experiments rats were administered single i.v. injections of exp 109 Cd or sup(115m)Cd at different doses. In the chronic exposure experiments rats were fed inactive Cd as CdCl sub 2 and were later administered exp 109 Cd via i.v. injection at various intervals following the CdCl sub 2 supply. Synchronised hair cycles in rats were induced by plucking in both groups of experiments. Sections of hair were found to reflect the amount of Cd present in blood at the time of their growth, and this Cd level was proportional to the administered Cd dose. The study does not, however, show a direct relationship between the Cd level in hair and the respective element concentration in such critical organs as liver and kidneys. Under the conditions of chronic exposure the Cd content in hair was also observed to be proportional to the level of intake, and the significance of this proportionality appears to vary with the duration of exposure. (Atomindex citation 11:531255)

PB81-139578 (Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
The Organization of Radiation Protection in Israel,
M. A. Greenfield. 30 Jun 80, 4p
Included in European Scientific Notes, v34 n6 p288-291, 30 Jun 80.

In Israel, radiation protection for the public is the responsibility of the Ministry of Health. However the personnel, space, facilities, and equipment to do the job are not part of some government agency as such, but rather are managed by the Research Institute for Environmental Health, an integral part of the School of Medicine in the Tel Aviv University. This cooperative arrangement between a government bureau and an educational institution has the advantage of minimizing bureaucracy and costs while ensuring that the regulatory function goes hand in hand with educational and research missions.

PB81-149478 PC **A02**/MF **A01**
Bureau of Radiological Health, Rockville, MD.
Bureau of Radiological Health Publications Subject Index.
Semiannual rept.
Nov 80, 18p FDA/BRH-81/18, DHHS/PUB/FDA-81-8070
Supersedes PB80-201221.

This Subject Index identifies Bureau publications by broad subject areas and is not intended to be a complete cross index containing name of author, date of publication, and other such biographical information. In nearly all cases the publications are numbered in the FDA publication series consisting of the FDA acronym, a 2-digit code for the fiscal year of publication, and a 4-digit code for the individual publication number. Since the publication numbering system was changed in 1978, the last 4-digit numbers prefixed with 78 or higher will be numbered consecutively without returning to 0001 each year.

PB81-856403 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Radiation Protection Laws. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 126p NERACEDBNT2506
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning international, national, and state radiation protection laws and atomic energy laws. Naturally occuring radioactivity in consumer products, and man-made radioactive materials and wastes in the environment are considered with regard to safety, liability, insurance, and other legal aspects. (Contains 129 citations, fully indexed and including a table of contents.)

6S. Stress Physiology

AD-A094 126/0 PC **A02**/MF **A01**
Systems Research Labs., Inc., Dayton, OH.
Optoelectronic Methodology Suitable for Electroretinographic Investigations during Environmental Stress.
Technical rept.,
David A. Ratino, Radames K. H. Gebel, Alva A. Karl, Diana R. Nelson, and Abbott T. Kissen. Dec 80, 18p AFAMRL-TR-80-78
Contract F33615-79-C-0500

A workable optoelectronic arrangement suitable for biomedical investigation in the field of electroretinography (ERG) was devised and is explained. ERGs were obtained in a nontraumatic manner from rhesus monkeys in an altitude chamber and under acceleration. The rhesus monkeys were exposed to a sequence of diffused flashes of light. Silver-silver-chloride electrodes attached to the monkey's head were used to pick up the electroretinal signals caused by the flashes of light. The active electrode was attached to the lower eyelid with the reference electrode at the ipsilateral ear and the ground electrode at the lateral canthus. The electroretinal signals were amplified recorded and then analyzed, using an averaging technique. Self-explanatory schematics detail the arrangement and type of instrumentation used. Cerebral oxygen tissue partial pressure (PO2) data, determined by an invasive polarographic method, were collected simultaneously with the ERG to search for a correlation between the two items. Eye safety considerations show that the flashes of light were of an intensity which is considered safe for nonhuman primates as well as for human subjects for an unlimited experimentation exposure time. (Author)

AD-A094 202/9 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
A Study of the Tolerance of ROK Air Force Personnel to Gz Centrifugation,
Byung Kook Lee, Jung Min Hwang, Jong Sang Chois, Sang Goo Shin, and Joung K. Park. 9 Dec 80, 16p Rept no. FTD-ID(RS)T-1721-80
Edited trans. of The Journal of the Korean Military Medical Association, Medical Bureau, Ministry of National Defense, Seoul, (Korea) v10 n1 p18-26 Sep 79.

No abstract available.

AD-A094 311/8 PC **A03**/MF **A01**
Naval Medical Research Inst., Bethesda, MD.
U.S. Navy Air Decompression Schedule Risk Analysis.
Medical research progress rept.,
T. E. Berghage, and D. Durman. Jan 80, 26p
Rept no. NMRI-80-1

The purpose of this report is to provide the diving community with an estimate of the risk associated with the use of the U.S. Navy's air decompression tables. A search of the diving data bank of the U.S. Navy Safety Center for the years 1971 to 1978 revealed 16,170 dives in which an air decompression schedule was used. These dives were sorted and tabulated by decompression schedule and decompression outcome. From these data, estimates of the incidence of decompression sickness associated with each schedule were derived. The overall incidence rate for the air decompression schedules was 1.25%; the incidence rate for individual schedules having more than 50 dives ranged from 0% to 4.8%. Only 43 of the 295 U.S. Navy air decompression schedules were used 100 times or more during the past 7 years. Over one-half of the available schedules were not used at all during this 7-year period. Although the Navy's experience with individual air decompression schedules is restricted, there is little evidence that the same incidence rate would not hold for all schedules in the air decompression table. (Author)

AD-A094 322/5 PC **A03**/MF **A01**
Army Research Inst. of Environmental Medicine, Natick, MA.
Use of a Wetted Cover to Reduce Heat Stress in Impermeable Clothing.
Technical rept.,
John R. Breckenridge. Oct 80, 38p Rept no. USARIEM-T-7/80

A mathematical model based on physical relations for heat exchange between clothed man and his environment has been developed which describes the cooling effect of a wet cover worn over an impermeable ensemble, in terms of the ensemble characteristics and the ambient environment. The model has been validated at low air movement for one such ensemble by comparing predictions of increased skin heat loss and cover evaporation with values obtained using an electrically heated copper manikin dressed in the ensemble, with the cover both dry and wetted. The model predicts for this ensemble supplementary cooling (increased skin heat loss) ranging from 40 watts at 35 degrees

C, 70% relative humidity, and low air movement to almost 200 watts for a hot/dry environment of 50 degrees C, 20% r.h., with 5 meters/second wind. Predicted water requirements to maintain the cover wet under these conditions range from 0.2 kilograms/hr to 1.9 kilograms/hr. The model also reveals that the wet cover would reduce the heat load imposed on a man by sunlight by 20 to 40 watts in full sun, but with a 0.2 to 0.3 kilograms/hr increase in water requirements. (Author)

AD-A094 379/5 PC **A03**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Vectorcardiographic Results of Human Exposures to +3GZ, +5GZ, and +7GZ.
Final rept. Aug 75-Dec 79,
M. Harold Laughlin, James E. Whinnery, Donald J. Cosgrove, Edward L. Fitzpatrick, and Harold N. Keiser. Oct 80, 26p Rept no. SAM-TR-80-31

Frank orthogonal vectorcardiograms (VCG) were recorded from 10 subjects before, during, and for 15 min after exposures to +3Gz +5Gz, and +7Gz. The order of acceleration exposure was randomized, with the individual exposures separated by at least one week. Standard USAF anti-G suits were worn by all subjects. Detailed analysis of the scalar lead electrocardiograms revealed no abnormalities and no consistent signs of conduction disturbances or ischemic ST-T segment changes. During +Gz stress, the QRS axis of the VCG demonstrated posterior rotation in the sagittal plan, and counterclock wise rotation in the transverse plane. The changes in the VCGs recorded during +Gz stress appeared to be related to rotational changes of the heart due to mechanical stress and/or motion within the thorax. There were no ECG or VCG changes indicative of myocardial ischemia and/or damage during or after +Gz stress. Comprehensive data obtained in this study are presented here. (Author)

AD-A094 580/8 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Bioengineering Div.
Approaches to Inflight Ear Oximetry.
Final rept. 1 May-31 Dec 79,
William A. Hyman. Oct 80, 15p SAM-TR-80-36
Contract F33615-79-D-0629

The USAF School of Aerospace Medicine, as part of its ongoing research in aircrew physiological response, has been interested in the capability of noninvasive measurement of arterial blood oxygen saturation during flying operations. This report addresses ear oximetry techniques as one of the candidate technologies for that measurement. A brief review of the history and present state-of-the-art of ear oximetry is presented. Related and alternate technologies for measurement of arterial blood oxygen saturation are also discussed. The study concludes that the current state-of-the-art of ear oximetry does not yield itself to development of a noninvasive measurement device that satisfies the severely restrictive constraints of size, weight, and power consumption required by inflight applications. The report recommends that related or alternate technologies, include transcutaneous oxygen electrodes, be investigated. (Author)

PB81-802910 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Stress Factors on Pilot Performance. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 251p
Supersedes PB80-803075, and NTIS/PS-78/1289.

The selected abstracts of research reports cover acceleration, circadian rhythms, physiology, psychology, neurology, man-machine systems, high altitude effects, noise effects, and vibration effects as related to stress factors on pilot performance. (This updated bibliography contains 246 citations, 31 of which are new entries to the previous edition.)

6T. Toxicology

AD-A094 183/1 PC **A02**/MF **A01**
Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario).
An Evaluation of the Toxic Hazard Associated with the Use of a Fluorescent Particle Atmosphere Tracer in an Urban Area.
Technical communication,
H. D. Madill, and J. J. Norman. Oct 80, 16p Rept no. DCIEM-80-C-54

The toxic hazard from the use of a fluorescent particle atmosphere tracer containing cadmium sulfide within and near the city of Winnipeg in 1953 was evaluated. From the airborne concentrations of this tracer measured in thirty-two separate tests, it was concluded that no toxic hazard to cadmium was produced. In all of the tests, the maximum concentrations measured were less than the current limits of safe occupational exposure to this compound. The maximum amount of cadmium sulfide which could have been inhaled was only 14 to 55 percent of the average daily dietary intake of cadmium normally assimilated by the people of an industrialized country. (Author)

AD-A094 187/2 PC **A04**/MF **A01**
Air Force Engineering and Services Center, Tyndall AFB, FL. Engineering and Services Lab.
The Toxicity and Biodegradability of Hydrazine Wastewaters Treated with UV-Chlorinolysis.
Final rept. Dec 78-Feb 79,
Anthony M. Wachinski, and Jay A. Farmwald. Apr 80, 60p Rept no. AFESC/ESL-TR-80-31

Warburg respirometric techniques were used to study the toxicity and biodegradability of a hydrazine wastewater treated with chlorine gas and ultraviolet radiation. The contrived wastewater, containing 500 ppm each of neat hydrazine, monomethyl hydrazine, unsymmetrical dimethylhydrazine, and dimethyl nitrosamine, was representative of those to be generated at the Rocky Mountain Arsenal Blend Facility. (Author)

AD-A094 236/7 PC **A04**/MF **A01**
Army Medical Bioengineering Research and Development Lab., Fort Detrick, MD.
Problem Definition Studies on Potential Environmental Pollutants. VII. Physical, Chemical, Toxicological, and Biological Properties of DDT and Its Derivatives.
Technical rept. Jan 76-Jun 79,
W. Dickinson Burrows, David R. Cogley, William G. Light, Jack C. Dacre, and Geoffrey Woodard. Jun 79, 71p Rept no. USAMBRDL-TR-7906

This report is a data base of physical, chemical, toxicological, and biological properties of DDT. Sufficient data are presented to allow a preliminary assessment of the human health impacts and ecological impacts of DDT at sites within the United States where DDT is found. This report is intended to be used with chemical analysis data of DDT concentrations in water, sediments, soils, and biota at particular sites of interest to develop a qualitative assessment of potential hazard. (Author)

AD-A094 426/4 PC **A02**/MF **A01**
Federal Aviation Administration, Washington, DC. Office of Aviation Medicine.
Effects of Long-Term Exposure to Low Levels of Ozone: A Review,
C. E. Melton. Sep 80, 16p Rept no. FAA-AM-80-16

Available literature regarding long-term effects of ozone on animals and humans is reviewed. Emphasis is placed on reports that have appeared since 1976, but some earlier reports are cited for completeness and perspective. This review shows that ozone concentration is more important than is duration of exposure in determining the effectiveness of an ozone exposure (dose). This conclusion calls into question the validity of the Time-Weighted Average (TWA) as an index of severity of ozone exposure. The literature review further reveals that there is wide variation in susceptibility of different animal species to ozone, making it difficult to apply results of animal experiments to humans. It further appears that a dose of ozone that is acutely innocuous is also innocuous over the long term. The effects of a symptom-producing dose of ozone are initially cumulative for the first two or three exposures, then an adaptive response may ensue that involves a plateau of response or even a reversal. These effects are shown by both animals and humans. The mechanisms are unknown. Ozone probably causes damage by free radical formation. Free radical scavengers such as vitamins E and C may provide protection against ozone damage. (Author)

AD-A094 501/4 PC **A05**/MF **A01**
Enviro Control, Inc., Rockville, MD.
Biological Effects of Short, High-Level Exposure to Gases: Ammonia.
Phase rept. May 79-May 80,
Llewellyn J. Legters. May 80, 87p
Contract DAMD17-79-C-9086

This report presents an analysis and synthesis of the available literature concerned with possible health and performance effects of exposures to ammonia. The US Army's concern is with short, high-level exposures that may exceed present threshold limit values of the American Conference of Governmental Industrial Hygienists (25 ppm or 17 mg/cum as a TWA and a ceiling of 35 ppm or 24 mg/cum for 15 minutes). The organs primarily affected by exposure to ammonia gas are the respiratory tract and the eyes. During brief exposures to concentrations of 500 ppm (348 mg/cum) or less, the biologic responses are immediate, reversible, and mainly irritant. Below 50 ppm (35 mg/cum), there are no significant effects except that the odor of ammonia is detectable. Between 50-100 ppm (35-70 mg/cum), most people experience some degree of irritation of the eyes, nose and throat. There is some evidence indicating that personnel may become acclimated to the irritant effects after only 1 or 2 weeks of intermittent exposure at these levels. Around 130 ppm (90 mg/cum), approximately half of exposed personnel experience lacrimation. Lacrimation has been reported in subjects inhaling 500 ppm (348 mg/cum) of ammonia via face mask, which should have prevented direct contact of ammonia with the eyes.

AD-A094 502/2 PC **A05**/MF **A01**
Enviro Control, Inc., Rockville, MD.
Biological Effects of Short, High-Level Exposure to Gases: Nitrogen Oxides.
Phase rept. May 79-May 80,
John D. Morton. Jul 80, 95p
Contract DAMD17-79-C-9086

This report presents an analysis of the available literature describing the health and performance effects of exposure to nitrogen oxides (NOx). The US Army's concern is with high-level, short-term exposures that may exceed present threshold limit values of the American Conference of Governmental Industrial Hygienists: 5 ppm (9 mg/cum) as a TWA; intended changes are a TWA of 3 ppm (5.4 mg/cum) with a short term exposure limit of 5 ppm (9 mg/cum) for 15 minutes. Dose-response relationships were developed for intensities of exposure from the highest (fatal) level to thresholds of minimal response. It is concluded that NOx can in general be equated to nitrogen dioxide (NO_2) because this is much more toxic than the only other oxide of importance, nitric oxide (NO), which oxidizes to NO_2 in air. If NO is present in equal or greater concentration, an allowance for its effect is recommended. NO_2 exhibits mainly two sets of toxicological characteristics: immediate irritancy and delayed, cumulative tissue damage. Proven effects are mainly on the respiratory tract. Intense exposures result in death, hospitalization with recovery, or severe responses not requiring hospitalization. Survivors may be free from permanent effects. This range covers concentrations from 20 ppm (38 mg/cum) to 200 ppm (376 mg/cum) and up, for single exposures of a few minutes up to 1 hour.

AD-A094 503/0 PC **A06**/MF **A01**
Enviro Control, Inc., Rockville, MD.
Biological Effects of Short, High-Level Exposure to Gases: Carbon Monoxide.
Phase rept. May 79-May 80,
Thomas E. Nightingale. Jun 80, 119p
Contract DAMD17-79-C-9086

This report presents an analysis and synthesis of the available literature describing health and per-

formance effects of exposure to carbon monoxide (CO). The US Army's concern is with high-level, short-term exposures that may exceed present threshold limit values of the American Conference of Governmental Industrial Hygienists (50 ppm as a TWA and a ceiling of 400 ppm for 15 minutes). The organs primarily affected by exposure to CO are the heart and brain, with effects caused by impaired oxygen delivery. During brief exposures to concentrations of up to 35,600 ppm, there was an electrocardiographic change suggestive of myocardial ischemia within 15 seconds after the start of exposure, although there were no changes in heart rate, blood pressure or blood chemistry values in young healthy subjects. The first subjective sign of CO toxicity will probably be a headache followed by a awareness of a pounding heartbeat; however, the great variation in tolerance precludes establishment of threshold values per se, although a carboxyhemoglobin (COHb) of 15 percent would probably not elicit these symptoms in most healthy subjects. Laboratory studies have shown a reduction in work capacity following CO exposure in humans. The basis for this lower work capacity has been investigated in both humans and animal models, which is compensated for by an increase in coronary blood flow in healthy subjects up to 9% COHb in man and 30% COHb in dogs.

AD-A094 504/8 PC **A09**/MF **A01**
Enviro Control, Inc., Rockville, MD.
Biological Effects of Short, High-Level Exposure to Gases: Sulfur Dioxide.
Phase rept. May 79-May 80,
Mary Janet Normandy, Philip Szlyk, and Brenda Brienza. May 80, 176p
Contract DAMD17-79-C-9086

This report presents an analysis and synthesis of the available literature concerned with possible health effects of exposures to sulfur dioxide. The U.S. Army is concerned with short, high-level exposures to sulfur dioxide that may exceed present threshold limit values of the American Conference of Governmental Industrial Hygienists (5 ppm, 13 mg/cu m as a time-weighted average. The organ systems primarily affected by exposure to sulfur dioxide are the respiratory tract and the eyes. Certain neurologic effects (including suppression of dark adaptation and decreased light sensitivity) are of unknown significance and warrant further study. Below about 5 ppm, there are no significant irritant or pulmonary effects. Between 5 and 8 ppm (13 and 20.8 mg/cu m), most people will experience coughing, moderate irritation of the eyes, nose, and throat, and bronchoconstriction. At about 10 ppm (26 mg/cu m), moderate to severe eye irritation, copious lacrimation, and nasal and chest irritation will occur. At 20 to 30 ppm (52 to 78 mg/cu m), intense lacrimation, respiratory tract irritation, bronchoconstriction, epistaxis, sneezing, coughing, and hemoptysis may occur. With nasal breathing, about 99% of inspired sulfur dioxide is absorbed by the nasal mucosa and only 1% penetrates the lower airways. With mouth breathing, the effects of sulfur dioxide at a given concentration may be intensified.

AD-A094 505/5 PC **A03**/MF **A01**
Enviro Control, Inc., Rockville, MD.
Biological Effects of Short, High-Level Exposure to Gases: Ammonia, Carbon Monoxide, Sulfur Dioxide, and Nitrogen Oxides.
Final summary rept. 1 Jun 79-15 Aug 80,
Llewellyn Legters, Thomas E. Nightingale, M. Janet Normandy, and John D. Morton. Jun 80, 31p
Contract DAMD17-79-C-9086

This project addressed the exposure of soldiers to toxic gases for periods of less than one hour and at concentrations above occupational exposure standards, with repetition up to six times per day for 14 days. Sources of the four gases are primarily propellant fumes and engine exhaust. Measurements have shown physiologically significant exposures to carbon monoxide and ammonia. Literature reviews and critical evaluations developed acceptable data bases on the types of biologic effects to be expected and on quantitative relationships between exposure level and intensity of response. These were interpreted in the context of the military exposure scenario and exposure criteria were suggested. Information gaps were identified and suggestions were made for further research. (Author)

PB81-141608 PC **A04**/MF **A01**
Oak Ridge National Lab., TN.
Proceedings of the Workshop on Subchronic Toxicity Testing Held at Denver, Colorado on May 20-24, 1979.
Final rept.,
Norbert Page, Daljit Sawhney, and Michael G. Ryon. Nov 80, 69p ORNL/EIS-189, EPA-560/11-80-028
Contract W-7405-eng-26

This workshop was held at Denver, Colorado, May 20-24, 1979, to assist the Office of Pesticides and Toxic Substances in developing guidelines for subchronic toxicity testing under the Toxic Substances Control Act. The participants were organized into committees to discuss the relationship of protocol design to chemical class, the experimental design (route of exposure, dose, duration, test species, and age and number of animals), the evaluation of toxic effects (clinical observations, clinical laboratory tests, and pathology), the criteria for data extrapolation from one route of administration to another route, and limitations of acute and subchronic tests. Research recommendations submitted by each committee for their topic areas are presented in the document.

PB81-144875 PC **A14**/MF **A01**
Environmental Protection Agency, Cincinnati, OH. Office of Research and Development.
Long-Term Effects of Air Pollutants: in Canine Species.
Series no. 8,
J. F. Stara, D. L. Dungworth, J. G. Orthoefer, and W. S. Tyler. Jul 80, 306p EPA-600/8-80-014
Prepared in cooperation with California Univ., Davis. School of Veterinary Medicine.

The Clean Air Act of 1970 as amended in 1977 requires that a comprehensive data base be established to assess human health effects caused by air pollution from mobile sources. The spectrum of potential toxic effects can be viewed from two perspectives: The first is the identification of toxic effects from combined low-level effects of the individual major ambient air pollutants, which are combustion by-products of automotive exhaust. Ideally, the major components of a data base used to develop health risk assessments are well-designed epidemiological studies and long-term, low-level animal studies. The 9-year study presented in this monograph reviews the effects following exposure of dogs for 68 months to automotive exhaust, simulated smog, oxides of nitrogen, oxides of sulfur, and their combinations. Studies using canine species over extended periods of time have proven useful in the evaluation of risk to humans, especially when combined with epidemiological studies and human clinical investigations. All of the data were reviewed at a conference held at Asilomr, California by invited expert scientists. Their evaluations and judgments form a significant segment of this monograph.

PB81-145138 PC **A07**/MF **A01**
Vanderbilt Univ., Nashville, TN.
A Study of the Inactivation of Protein Toxin (Bacterial Toxin) with Formaldehyde.
Final rept. Nov 73-Dec 77,
John P. Robinson. Dec 80, 146p FDA/BB-81/21
Contract FDA-233-76-1236

Purified tetanus toxin was obtained from culture filtrates and extracts of cells. Diphtheria toxin was purified from culture filtrates. The toxins were characterized by biological and physiochemical methods. The toxins were modified by interaction with formaldehyde and other chemical reagents. It was determined that formaldehyde induces conformational changes, that it alters the amino acid composition of the toxins, and that radioactive formaldehyde was not selectively introduced into groups which might be responsible for toxicity. This study provides additional information regarding the mechanisms by which formaldehyde inactivates bacterial toxins.

PB81-149742 PC **A07**/MF **A01**
West Virginia Univ., Morgantown. Water Research Inst.
Cellular Bioassay of Fish as a Sensitive Index of Water Quality Related to Mine Water.
Technical completion rept.,
David E. Hinton, and Elizabeth R. Walker. Sep 80, 139p W81-00980, OWRT-A-037-WVA(1)
Contract DI-14-34-0001-0152

The overall objective was to develop a cellular bioassay useful in determining the effects of constituents of mine water (acid, pH, and metals) upon tissues and enzymes of freshwater fishes and to determine, via biological criteria, water quality. Coal-associated polynuclear aromatics caused induction of drug metabolizing enzymes in fish. Mn(++) caused enhanced metabolism of benzo (a) pyrene in-vitro but was inhibitory under in-vivo conditions in rainbow trout. Particulate iron (Fe203) suspended in aquarium water and Mn(++) caused gill alterations. Most subtle changes involved swelling of surface epithelial cells (both metals) and appearance of phagocytic cells in secondary lamellae (Fe203). Mn(++) caused a reduction in the surface microbridge of gill epithelial. A quantitative morphometric evaluation of control and acid-stressed (pH 4.0 or 5.0 by addition of H2SO4 to aquarium water) bullhead catfish showed a two-fold increase in the number of skin mucous cells of exposed fish, which was associated with an equivalent increase in volume density of skin mucosubstances. The three individual components of mine waters produced alterations which were easily differentiated from those produced by other agents and constitute evidence that cellular bioassay of target tissues in exposed fishes may yield valuable information relative to water quality.

PB81-802795 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Asbestos and Silicate Pollution. 1970-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1970-Jan 81.
Jan 81, 199p
Supersedes PB80-802903, and NTIS/PS-78/1245.

The cited reports from a worldwide literature survey relate to detection, control, sampling, and chemical analysis of silicate and asbestos pollution in water, air, and soil. Included are a few citations on the environmental impacts of these chemicals. (This updated bibliography contains 252 citations, 9 of which are new entries to the previous edition.)

PB81-802803 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Asbestos and Silicate Pollution. 1977-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1977-Nov 79.
Jan 81, 219p

Research reports on air and water pollution by silica, asbestos, silicates and silicon dioxide are cited. The citations cover sources, control, detection, and effects on plants, animals, and humans (silicosis, asbestosis, and toxicity). (This updated bibliography contains 212 citations, none of which are new entries to the previous edition.)

PB81-802811 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Asbestos and Silicate Pollution. December, 1979-January, 1981 (Citations from the NTIS Data Base).
Rept. for Dec 79-Jan 81.
Jan 81, 107p
Supersedes PB80-802895, and NTIS/PS-78/1244. See also 1964-1976, NTIS/PS-78/1243.

This bibliography cites Federally-funded research reports on air and water pollution by silica, asbestos, silicates, and silicon dioxide. The citations cover sources, control, detection, and effects on plants, animals, and humans (silicosis, asbestosis, and toxicity). (This updated bibliography contains 100 citations, all of which are new entries to the previous edition.)

PB81-935900 Subscription
National Cancer Inst., Bethesda, MD. International Cancer Research Data Bank.
Chemical Carcinogenesis: Azo Dyes, Aryl Amines, and Related Compounds.
Cancergram CK10.
1981, 12 issues
Paper copy available on subscription, North American Continent price $24.00/year; all others write for quote. Also available in single copies.

This agent-oriented Cancergram deals with carcinogenicity of fluorene derivatives, azo compounds, naphthylamines, nitroguinoline oxides, and other related specific substances (including hair dyes). The scope includes carcinogenicity and modification of carcinogenicity, metabolic, physiologic and morphologic effects, mutagenicity and in vivo testing, studies of human exposure, chemical and physical properties, and analytic methods. The Cancergram generally excludes studies where the compounds are used simply as a means of inducing experimental tumors for other studies, and specifically excludes aromatic nitrosamines (covered by Cancergram series CK01) and aromatic halogen compounds (covered by Cancergram series CK13).

7. CHEMISTRY

7A. Chemical Engineering

FE-0496-176 PC **A07**/MF **A01**
Pittsburg and Midway Coal Mining Co., Denver, CO.
Solvent Refined Coal (SRC) Process. Quarterly Technical Progress Report, July 1979-September 1979.
Feb 80, 144p
Contract AC01-76ET10104

This report summarizes the progress of the Solvent Refined Coal project by the Pittsburg and Midway Coal Mining Co. for the Department of Energy for the period June 25, 1979 through September 30, 1979. Except for brief periods, the Fort Lewis Pilot Plant continued to operate in the SRC-I mode and to process Kentucky No. 9 and 14 coal from Pittsburg and Midway's Colonial Mine. Testing of the Lummus Antisolvent Deashing Unit resumed July 21 and continued to operate through August 20, but prolonged steady state operation was not achieved. The Pilot Plant was shutdown August 25 to complete the installation of the new preheater in Area 02, for annual inspection, for conversion to SRC-II mode operation, and for extensive modifications to Areas 01 and 04. Operation is scheduled to resume the week of October 12 in the SRC-II mode to test the new Area 02 preheater. Process Development Unit P-99 was down during July for the annual summer trunaround. Returning to lined out conditions on coal after the turnaround was delayed by a series of equipment failures. After these problems were overcome, two runs (Runs 56 and 57) were completed. These runs, made on Powhatan No. 5 Mine coal, showed that C sub 5 -900 exp 0 F distillate yield increased about 5% as pressure was increased from 2000 to 2500 psig. (ERA citation 06:004458)

PB81-801805 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Textile Processing Wastes and Their Control. 1970-1978 (Citations from the Engineering Index Data Base).
Rept. for 1970-78.
Jan 81, 204p

This bibliography contains worldwide citations on the textile industry as it deals with water pollution, air pollution, and solid wastes and their control. It includes studies of wastewater treatment of dyes, the use of activated carbon in the processes, design criteria of the control equipment, and reusing materials that are recovered in the control process. (This updated bibliography contains 192 citations, none of which are new entries to the previous edition.)

PB81-801813 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Textile Processing Wastes and Their Control. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 210p
Supersedes PB80-802267, and NTIS/PS-78/1265.

The bibliography contains selected abstracts of research reports covering textile processing, air pollution control, water pollution control, and solid waste disposal. Included are waste water treatment studies on dyes, biological industrial waste treatment, use of membranes, cost estimates of the control technology, and design criteria of control equipment. (This updated bibliography contains 200 citations, 37 of which are new entries to the previous edition.)

PB81-801821 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Textile Processing Wastes and Their Control. 1979-1980 (Citations from the Engineering Index Data Base).
Rept. for 1979-80.
Jan 81, 69p
Supersedes PB80-802275, and NTIS/PS-78/1266.

These citations of worldwide research cover the textile industry as it deals with water pollution, air pollution, and solid wastes and their control. The bibliography includes studies of wastewater treatment of dyes, the use of activated carbon in the processes, design criteria of the control equipment, and reusing materials that are recovered in the control process. (This updated bibliography contains 62 citations, 40 of which are new entries to the previous edition.)

7B. Inorganic Chemistry

AD-A094 109/6 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Effect of Chalcogen Nonstoichiometry on Superconductivity in Chevrel-Phase Tin Molybdenum Sulfides,
Frank S. Delk, II , and M. J. Sienko. 17 Sep 79, 5p AFOSR-TR-80-1230
Grant AFOSR-80-0009
Pub. in Inorganic Chemistry, v19 p788-789 1980.

No abstract available.

7C. Organic Chemistry

AD-A094 139/3 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemistry.
Synthesis and Crystal Structures of Two Iron Derivatives of Permethylcyclopentasilane,
Timothy J. Drahnak, Robert West, and Joseph C. Calabrese. 21 Nov 79, 17p AFOSR-TR-80-1284
Grant AFOSR-78-3570
Pub. in Jnl. of Organometallic Chemistry, v198 p55-69 1980.

No abstract available.

AD-A094 156/7 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Practical Synthesis of Semibullvalene,
Nicholas J. Turro, Jong-Min Liu, Howard E. Zimmerman, and Ronda E. Factor. 24 Mar 80, 2p AFOSR-TR-80-1241
Grant AFOSR-78-3502
Pub. in Jnl. of Organic Chemistry, v45 p3511-3512 1980. Prepared in cooperation with Wisconsin Univ., Madison. Dept. of Chemistry, Grant NSF-GM-07487.

No abstract available.

AD-A094 159/1 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Synthesis of Methylhydrazine in Nonaqueous Solvents,
Sampat R. Jain, Milap A. Mathur, and Harry H. Sisler. 6 Nov 79, 5p AFOSR-TR-80-1281
Grant AFOSR-80-0007
Pub. in Inorganic Chemistry, v19 n7 App II p2191-2195 1980.

No abstract available.

PATENT-4 233 258 Not available NTIS
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Method for Preparing Addition Type Polyimide Prepregs.
Patent,
T. L. St.Clair. Filed 13 Feb 79, patented 11 Nov 80, 5p N81-14078/2, PAT-APPL-6-011 737
Supersedes PAT-APPL-6-011 737, N79-19160 (17-10, p 1257).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A novel addition polyimide based on the use of liquid monomers wherein the essentially solventless prepreg produced therefrom retains good drape, tack and other mechanical properties.

PATENT-4 234 715 Not available NTIS
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Perfluoroalkyl Polytriazines Containing Pendent Iododifluoromethyl Groups.
Patent,
R. W. Rosser, and T. Psarras. Filed 8 May 79, patented 18 Nov 80, 5p N81-14016/2, PAT-APPL-6-037 066
Supersedes PAT-APPL-6-037 066, N79-24153 (17 - 15, p 1960). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissione: of Patents, Washington, DC. 20231 $0.50.

New perfluoroalkyl polytriazines containing pendent iododifluoromethyl groups are prepared by the reaction of perfluoroalkyl dinitriles with ammonia to form poly(imidoylamidines), followed by the cyclization of the imidoylamidine groups with, e.g., various mixtures of a perfluoroacyl fluoride with an omega iodoperfluoroacyl fluoride. The polytriazines obtained can be cured by heat which causes crosslinking at the iododifluoromethyl groups by elimination of iodine and formation of carbon-to-carbon bonds.

PATENT-4 237 271 Not available NTIS
Department of Agriculture, Washington, DC.
Crosslinked Starch Halohydrins and Their Nitrogen-Containing Substitution Products.
Patent,
Warren E. Rayford, and Robert E. Wing. Filed 24 Apr 79, patented 2 Dec 80, 7p PB81-147480, PAT-APPL-6-032 850
Supersedes PB-297 895.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Crosslinked starch is reacted with an epihalohydrin in the presence of a strong acid catalyst to produce the 3-halo-2-hydroxypropyl ether. Substitution of the halogen with nitrogen-containing compounds enables the preparation of novel water-insoluble cationic, anionic, and chelating starch ethers, as well as starch ethers having degrees of substitution heretofore unattainable in the prior art.

PB81-145526 Not available NTIS
National Bureau of Standards, Washington, DC.
Synthesis and Antitumor Activity of Cyclophosphamide Analogs. 3.1 Preparation, Molecular Structure Determination, and Anticancer Screening of Racemic cis- and trans-4-Phenylcyclophosphamide,
Victoria L. Boyd, Gerald Zon, Vicky L. Himes, Judith K. Stalick, and Alan D. Mighell. 1980, 3p
Sponsored in part by National Intitutes of Health, Bethesda, MD., and Food and Drug Administration, Washington, DC.
Pub. in Jnl. of Medical Chemistry 23, n4 p372-375 1980.

Cyclization of racemic 3-amino-3-phenyl-1-propanol with bis(2-chloroethyl) phosphoramidic dichloride gave a diastereomeric mixture of 4-phenylcyclophos-phamide which was chromatographically separated into the faster and slower eluting components. A combination of (1)H/(31)P NMR and IR spectral data indicated that the fater a slower racemates correspond to cis-3 (mp 129-130C) and trans-3 (mp 112-114.5C), respectively. The molecular structure of the former compound was determined by X-ray crystalography, and thereby unambiguously established the cis relationship between equatori disposed phenyl and P=0 substituents in a chair conformation. These results confirm stereochemical assignments for cis- and trans-3 which have been independently deduced Shih, et al. Anticancer screening tests against L121 lymphoid leukemia in mice have revealed that while both diastereomers of 3 afford toxmetabolites, trans-3 led to therapeutic activity (T/C = 149, 250 mg/kg) and cis-3 did (T/C less than 125, 500-15.63 mg/kg). The relevance of these findings to results reported fo 4-methylcyclophosphamide and cyclosphamide is briefly discussed.

7D. Physical Chemistry

AD-A094 047/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Spectroscopy Lab.
Optical-Optical Double-Resonance Spectroscopy of CaF,
Peter F. Bernath, and Robert W. Field. 3 May 80, 11p AFOSR-TR-80-1309
Grants AFOSR-76-3056, NSF-CHE78-18427
Pub. in Jnl. of Molecular Spectroscopy, v82 p339-347 1980. Sponsored in part by Grant NSF-CHE75-19410.

No abstract available.

AD-A094 062/7 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
Molecular-Orbital Models for the Catayitic Activity and Selectivity of Coordinatively Unsaturated Platinum Surfaces and Complexes.
Interim rept.,
A. C. Balazs, and K. H. Johnson. 31 Dec 80, 42p Rept no. 12
Contract N00014-75-C-0970, Grant NSF-DMR76-80895

Electronic structures have been calculated for 5-, 6-, and 10-atom Pt clusters, as well as for a Pt(PH3)4 coordination complex, using the self-consistent-field X-alpha scattered-wave (SCF-X-alpha-SW) molecular-orbital technique. The 10-atom cluster models the local geometry of a flat, unreconstructed Pt(100) surface, while the 5- and 6-atom clusters show features of a stepped Pt surface. Pt(PH3)4 resembles the chemically similar homogeneous catalyst Pt(PPh3)4. Common to all these coordinatively unsaturated complexes are orbitals lying near or coinciding with the highest occupied molecular orbital ('Fermi level') which show pronounced d lobes pointing directly into the vacuum. Under the hypothesis that these molecular orbitals are mainly responsible for the chemical activities of the above species, one can account for the relative similarities and differences in catalytic activity and selectivity displayed by unreconstructed Pt(100) surfaces, stepped Pt surfaces or particles, and isolated Pt(PPh3)4 coordination complexes. The relevance of these findings to catalyst-support interactions is also discussed. Finally, relativistic corrections to the electronic structures are calculated and their implications on catalytic properties discussed. (Author)

AD-A094 063/5 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Francis Bitter National Magnet Lab.
Electronic Energy Levels of Intermediates in the Nickel Carbonylation Reaction.
Interim rept.,
I. A. Howard, G. W. Pratt, K. H. Johnson, and G. Dresselhaus. 31 Dec 80, 21p Rept no. 13
Contract N00014-75-C-0970, Grant AFOSR-77-3130
Sponsored in part by Grant NSF-DMR78-24185.

Using the multiple scattering X-alpha method, electronic energy levels have been found self-consistently for the intermediates Ni(CO)(n), n=1,2,3 in the formation of nickel tetracarbonyl via the Ni-CO surface reaction. Linear geometries have been assumed for NiCO and Ni(CO)2, and a trigonal planar conformation for Ni(CO)3, in accordance with previously published IR spectra. The intermediates were assumed to be in the gas phase, free of surface interaction. From the energy level structure found, all three of the intermediates were determined to be diamagnetic, as Ni(CO)4 is known to be. (Author)

AD-A094 089/0 PC **A02**/MF **A01**
Wisconsin Univ.-Milwaukee. Dept. of Physics.
Force on an Atom in an Electrostatic Field: Feynman-Hellmann Theorem and Oscillator Strengths.
Rept. for 1 Jan-31 Dec 79,
Richard S. Sorbello, and Basab B. Dasgupta. 3 Jul 79, 6p AFOSR-TR-80-1278
Grant AFOSR-76-3082
Pub. in Physical Review B, v21 n6 p2196-2200, 15 Mar 80.

No abstract available.

AD-A094 090/8 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Quenching of Chemiexcited Acetone Phosphorescence by Aryl Alkyl Ketones. A Search for Electronic Effects.
24 Aug 79, 6p AFOSR-TR-80-1238
Grants AFOSR-78-3502, NSF-CHE73-04672
Pub. in Nouveau Jnl. de Chimie v4 n7 p471-474 1980. Prepared in cooperation with Michigan State Univ., East Lansing.

No abstract available.

AD-A094 091/6 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Formation of Dimethylmercury in the Oxidation of Methylhydrazine by Mercuric Oxide,
Harry H. Sisler, Milap A. Mathur, Sampat R. Jain, and Roy W. King. 27 Nov 79, 3p AFOSR-TR-80-1282
Grant AFOSR-80-0007
Pub. in Jnl. of Organic Chemistry v45 p1329-1330 1980.

No abstract available.

AD-A094 094/0 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Organic Photochemistry: The Laser versus The Lamp. The Behavior of Diphenylcarbene Generated at High Light Intensities,
Nicholas J. Turro, Masayuki Aikawa, Jared A. Butcher, Jr., and Gary W. Griffin. 18 Dec 79, 3p AFOSR-TR-80-1239
Grants AFOSR-78-3502, NSF-MPS75-14831
Pub. in Jnl. of the Americal Chemical Society, v102 p5127-5128 1980.

No abstract available.

AD-A094 095/7 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Multiphoton-Multiphonon Theory of Laser-Stimulated Surface Processes,
Jui-teng Lin, A. C. Beri, Thomas F. George, Michael Hutchinson, and William C. Murphy. 17 Jul 80, 5p AFOSR-TR-80-1223
Contracts F49620-78-C-0005, N00014-80-C-0472
Pub. in Physics Letters, v79A, n2,3 p233-236, 29 Sep 80.

No abstract available.

AD-A094 097/3 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
A New Semiclassical Decoupling Scheme for Electronic Transitions in Molecular Collisions: Application to Vibrational-to-Electronic Energy Transfer,
Hai-Woong Lee, Kai S. Lam, Paul L. DeVries, and Thomas F. George. 24 Jan 80, 9p AFOSR-TR-80-1261
Contract F49620-78-C-0005, Grant AFOSR-79-0122
Pub. in Jnl. of Chemical Physics, v73 n1 p206-212, 1 Jul 80. Sponsored in part by Grant NSF-CHE77-27826.

No abstract available.

AD-A094 098/1 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. Arthur Amos Noyes Lab. of Chemical Physics.
Hyperspherical Coordinates in Quantum Mechanical Collinear Reactive Scattering,
Aron Kuppermann, Jack A. Kaye, and John P. Dwyer. 29 Apr 80, 7p AFOSR-TR-80-1222
Contract F49620-79-C-0187
Pub. in Chemical Physics Letters, v74 n2 p257-262, 1 Sep 80.

No abstract available.

AD-A094 105/4 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY.
Effect of Nonstoichiometry on the Periodic Lattice Distortion in Vanadium Diselenide,
Lynn F. Schneemeyer, Angelica Stacy, and M. J. Sienko. 19 Dec 79, 6p AFOSR-TR-80-1232
Grant AFOSR-80-0009
Pub. in Inorganic Chemistry, v19 p2659-2662 1980.

No abstract available.

AD-A094 107/0 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Conduction-and Localized-Electron Spin Resonance in the Lithium-Methylamine System: Inferences for the Existence of the Metallic Compound Tetramethylaminelithium(Zero),
Peter P. Edwards, Andrejs R. Lusis, and M. J. Sienko. 13 Sep 79, 13p AFOSR-TR-80-1229
Grants AFOSR-80-0009, NSF-CHE78-12238
Pub. in The Journal of Chemical Physics, v72 n5 p3103-3112, 1Mar 80.

No abstract available.

AD-A094 108/8 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Crystal Data for Mixed-Anion Molybdenum Dichalcogenides,
Lynn F. Schneemeyer, and M. J. Sienko. 17 Sep 79, 6p AFOSR-TR-80-1231
Grant AFOSR-80-0009
Pub. in Inorganic Chemistry, v19 n3 p789-791 1980.

No abstract available.

AD-A094 112/0 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
Temperature Dependence of the Electron Spin-Lattice Relaxation in Lithium-Methylamine Solutions,
James R. Buntaine, M. J. Sienko, and Peter P. Edwards. 17 Jul 79, 6p AFOSR-TR-80-1235
Grants AFOSR-80-0009, NSF-CHE78-12238
Pub. in Jnl. of Physical Chemistry, v84 n10 p1230-1232 1980.

No abstract available.

AD-A094 114/6 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Chemical Control of Superconductivity in the Hexaborides,
Kurt Hiebl, and M. J. Sienko. 27 Nov 79, 4p AFOSR-TR-80-1237
Grant AFOSR-80-0009
Pub. in Inorganic Chemistry, v19 p2179-2180 1980.

No abstract available.

AD-A094 115/3 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Rotational and Vibrational Analysis of the CaF B2 Sigma(+) - X2 Sigma(+) System,
Michael Dulick, Peter F. Bernath, and Robert W. Field. 17 Dec 79, 12p AFOSR-TR-80-1313
Grant AFOSR-76-3056
Pub. in Canadian Jnl. of Physics, v58 n5 p703-712 1980.

No abstract available.

AD-A094 116/1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.

Intermodulated Fluorescence Spectroscopy of CaF A2 PI - X2 Sigma(+),
Peter F. Bernath, P. G. Cummins, and Robert W. Field. 2 Jan 80, 4p AFOSR-TR-80-1310
Grant AFOSR-76-3056
Pub. in Chemical Physics Letters, v70 n3 p618-620, 15 Mar 80.

No abstract available.

AD-A094 118/7 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
High Resolution and Sub-Doppler Fourier Transform Spectroscopy: Iodine Molecular Fluorescence Excited by the 514.5 and 501.7 nm Ar(+) Laser Lines,
R. Bacis, S. Churassy, Robert W. Field, and J. B. Koffend. 11 Jun 79, 10p AFOSR-TR-80-1312
Grant AFOSR-76-3056
Pub. in Jnl. of Chemical Physics, v72 n1 p34-42, 1 Jan 80.

No abstract available.

AD-A094 138/5 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Chemistry.
Sulfur and Selenium Insertion into the Silicon-Silicon Bond in Decamethylcyclopentasilane,
Maria Wojnowska, Wieslaw Wojnowski, and Robert West. 20 Mar 80, 3p AFOSR-TR-80-1265
Grant AFOSR-78-3570
Pub. in Jnl. or Organometallic Chemistry, v199 pc1-c2 1980.

No abstract available.

AD-A094 155/9 PC **A02**/MF **A01**
Johns Hopkins Univ., Baltimore, MD. Dept. of Chemistry.
An SCF and MCSCF Description of the Low-Lying States of MgO,
C. W. Bauschlicher, Jr., D. M. Silver, and David R. Yarkony. 31 Oct 79, 5p AFOSR-TR-80-1221
Grants AFOSR-79-0073, NSF-CHE78-24153
Pub. in Jnl. of Chemical Physics, v73 n6 p2867-2870, 15 Sep 80.

No abstract available.

AD-A094 157/5 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Chemiluminescent Thermolysis of Alpha-Peroxylactones,
Nicholas J. Turro, and Ming-Fea Chow. 2 Nov 79, 8p AFOSR-TR-80-1240
Grant AFOSR-78-3502
Pub. in Jnl. of American Chemical Society, v102 n15 p5058-5064 1980.

No abstract available.

AD-A094 158/3 PC **A03**/MF **A01**
Catholic Univ. of America, Washington, DC. Dept. of Physics.
Phase Diagrams of a Simple H-Bonded Lattice Gas Obtained With The Cluster Variation Method.
Technical rept.,
Eddy van Royen, and Paul H. E. Meijer. Jan 81, 38p Rept no. TR-4
Contract N00014-78-C-0518

We evaluate the Bell-lattice-model for water by exploring the parameter space by means of the Cluster Variation method of Kihuchi. We use ten order parameters to describe the different occupation of tetrahedrons in the lattice, with and without hydrogen bonds. The phase diagrams are represented in the density-temperature plane and in the pressure temperature plane. An explanation is given as to why there are first order terminal points in the metastable region. We discuss the 180 degree rule and display the ratios of hydrogen bonded pairs versus non-hydrogen bonded pairs. (Author)

AD-A094 161/7 PC **A02**/MF **A01**
University of Southern California, Los Angeles.
Ultrasensitive Detection of Aromatic Hydrocarbons by Two-Photon Photoionization,
Charles Klimcak, and John Wessel. 17 Mar 80, 5p AFOSR-TR-80-1263
Grants AFOSR-77-3438, NSF-CHE77-16074
Pub. in Applied Physics Letters, v37 n2 p138-141, 15 Jul 80. Prepared in cooperation with The Aerospace Corp., Los Angeles, CA. Ivan A. Getting Labs.

No abstract available.

AD-A094 162/5 PC **A02**/MF **A01**
University of Southern California, Los Angeles.
Gas Chromatography with Detection by Laser Excited Resonance Enhanced 2-Photon Photoionization,
Charles M. Klimcak, and John E. Wessel. 21 Jan 80, 8p AFOSR-TR-80-1264
Grants AFOSR-77-3438, NSF-CHE77-16074
Pub. in Analytical Chemistry, v52 n8 p1233-1239 Jul 80. Prepared in cooperation with The Aerospace Corp., Los Angeles, CA. Ivan A. Getting Labs.

No abstract available.

AD-A094 180/7 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Chemistry.
The Bonding in Some Bis(Arene)Chromium Compounds as Indicated by UV Photoelectron Spectroscopy.
Technical rept.,
D. E. Cabelli, A. H. Cowley, and J. J. Lagowski. 22 Dec 80, 16p Rept no. TR-80-02
Contract N00014-76-C-0577

He(I) ultraviolet photoelectron (UV-PES) spectra are reported for several bis(arene)chromium compounds. The arenes concerned are m-trifluoromethylbenzotrifluoride, p-fluorobenzetrifluoride, p-difluorobenzene, m-dichlorobenzene, fluorobenzene, chlorobenzene, methylbenzoate, p-chlorotoluene, diphenyl ether, toluene, o-xylene, trimethylsilylbenzene, isobutylbenzene, 1,2,3-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,2,4,5-tetremethylbenzene. The spectra have been interpreted using a qualitative perturbation molecular orbital model. The two major findings of the work are: (1) the ionizations from the metal-localized a sub 1g and e sub 2g molecular orbitals are governed primarily by ligand electronegativity, but there is some evidence for the operation of conjugative effects, and (2) the ionization energies of the free and coordinated arenes are quite similar. (Author)

AD-A094 214/4 PC **A07**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Infrared Optical Properties of Solid Mixtures of Molecular Species at 20 K.
Final rept. 1 Oct 79-1 Feb 80,
K. F. Palmer, B. E. Wood, and J. A. Roux. Jan 81, 135p Rept no. AEDC-TR-80-30
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Infrared transmittance spectra were measured by a Fourier transform spectrometer for 20 K cryofilms of homogeneous mixtures of N2, Ar, NH3, CO, CO2, and H2O molecules. Such cryofilms may contaminate cryogenic optical surfaces of spacecraft or aircraft. The films, cryopumped onto a 20 K germanium substrate, varied from 0.24 to 13 micrometers thick. The spectral domain ranged from 500 to 3700/cm. For all films, the complex refractive index (n = n + iK) was determined at each wavenumber by fitting the experimental behavior of the transmittance with film thickness to a lamellate model of the film and substrate. The model accounts for beam reflection losses as well as attenuation caused by passing the beam through the film and substrate materials. A Kramers-Kronig (KK) technique for obtaining the n values is compared with the thin-film determination of n. (Author)

AD-A094 243/3 Not available NTIS
California Univ., Berkeley. Naval Biosciences Lab.
Determination and Identification of Hydrocarbon Pollutants by Thin-Layer Chromatography,
H. E. Guard, L. H. Disalvo, and J. Ng. 1980, 7p
Contracts N00014-69-A-0200-1001, N00015-75-C-0157
Availability: Pub. in Analytical Techniques in Environmental Chemistry, p63-68 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 244/1 PC **A03**/MF **A01**
Wisconsin Univ.-Madison. Materials Science Center.
Comparison of Site-Specific Densities of States of Ga and As in Cleaved and Sputtered GaAs(110) by Means of Auger Line Shapes.
Technical rept.,
G. D. Davis, D. E. Savage, and M. G. Lagally. 30 Nov 80, 28p Rept no. TR-4
Contract N00014-77-C-0474

Site-specific densities of states for the Ga and As sites in GaAs (110) are derived from the M(1)M(45)V Auger lines and compared for the cleaved and sputtered surfaces. X-ray photoelectron spectroscopy, scanning electron microscopy, and LEED results for these surfaces are also presented. The results are interpreted in terms of a structure for the sputtered surface that consists of a two-phase mixture of Ga and disordered GaAs. (Author)

AD-A094 258/1 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Interagency Nitric Oxide Measurement Investigation: AEDC Results for Phase III (Comparison of Optical and Probe Measurements of Nitric Oxide Concentration in Combustors).
Final rept. Oct 79-Jan 80,
J. D. Few, H. S. Lowry, III, and W. K. McGregor. Jan 81, 63p Rept no. AEDC-TR-80-22
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

The purpose of Phase III of this program was to measure NO concentration on three successively more complicated combustion systems using both optical and probe techniques. The results of all measurements, both probe and optical, were compared and analyzed. Generally, the NO concentrations determined by the optical method were no larger than 30 percent above the values obtained with probes for a methane/air flat-frame burner, a propane/air swirl combustor, and a liquid-fueled simulated jet engine combustor. Close examination of the data revealed that probe results were influenced by some chemical reaction. The probes were designed for subsonic, atmospheric pressure flows, and arguments are presented to show that the agreement found in these experiments need not be expected in near sonic or supersonic flow using the same probe designs.

AD-A094 307/6 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Entropic and Enthalpic Contributions to the Solvent Dependence of the Thermodynamics of Transition-Metal Redox Couples. I. Couples Containing Aromatic Ligands.
Technical rept.,
Saeed Sahami, and Michael J. Weaver. 8 Jan 81, 33p Rept no. TR-3
Contract N00014-79-C-0670
See also AD-A094 308.

Variations in the solvent medium are generally expected to yield profound changes in the thermodynamics and kinetics of electron transfer reactions. The origins of the observed solvent effects are frequently manifold, arising from alterations in the chemical nature of the reacting species as well as the reactant-solvent interactions in both the ground reactant and transition states. We have embarked on a systematic study of solvent effects upon the electrode kinetics and thermodynamics of redox couples involving substitutionally inert cations where the oxidized and reduced species are both stable in the solution phase and differ only by one electron.

AD-A094 308/4 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Entropic and Enthalpic Contributions to the Solvent Dependence of the Thermodynamics of Transition-Metal Redox Couples II. Couples Containing Ammine and Ethylenediamine Ligands.
Technical rept.,
Saeed Sahami, and Michael J. Weaver. 8 Jan 81, 25p
Contract N00014-79-C-0670
See also AD-A094 307.

We have been examining the solvent dependence of the thermodynamics of simple transition-metal

redox couples as part of an experimental program exploring the role of the solvent in the kinetics and thermodynamics of outer-sphere electron transfer reactions. One-electron redox couples containing substitutionally inert complexes form especially tractable systems for this purpose since the influence of variations in the outer-shell solvent contributions can be assessed separately from the inner-shell (metal-ligand coordination shell) effects. Our general approach is to determine the formal potential Ef of each redox couple in a range of solvents having suitably varied chemical and physical properties. In addition, the temperature dependence of Ef is monitored in each solvent using a nonisothermal cell arrangement, yielding values of the reaction entropy of the redox couple equals the difference between the absolute ionic entropies of the reduced and oxidized forms. These measurements yield estimates of the free energy, entropy, and enthalpy of transferring the redox couple from water to other solvents.

AD-A094 309/2 PC **A03**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Solvent Effects on the Kinetics of Simple Electrochemical Reactions. I. Comparison of the Behavior of Co(III)/(II) Trisethylenediamine and Ammine Couples with the Predictions of Dielectric Continuum Theory.
Technical rept.,
Saeed Sahami, and Michael J. Weaver. 8 Jan 81, 36p
Contract N00014-79-C-0670

The electroreduction kinetics of Co(en)3(3+) (en = enthylenediamine), Co(NH3)6(3+), and Co(NH3)5F(2+) have been investigated at mercury electrodes in aqueous solution and six nonaqueous solvents in order to explore the influence of the solvent upon the electrode kinetics of such simple one-electron outer-sphere reactions where the composition of the reactant's coordination sphere remains fixed. Substantial variations in the experimental rate parameters were observed as the solvent was altered; these reflect the influence of the outer-shell solvent upon the reorganization barrier to electron transfer. A simple phenomenological treatment of solvent effects upon the electrode kinetics of such simple redox reactions is given. It is pointed out that double-layer corrected rate constants kcorr can be evaluated at the same Galvani potential in different solvents with useful accuracy; these quantities can provide particular insight into the chemical influence of the solvent. The utility of separating such solvent effects into intrinsic and thermodynamic contributions is noted. The substantial decreases in kcorr seen when substituting several nonaqueous solvents for water were traced to increases in the outer-shell component of the intrinsic free energy barrier.

AD-A094 310/0 PC **A03**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Classical Model of Laser-Stimulated Surface Processes: Energy Absorption Profiles via the Langevin Equation.
Technical rept.,
Jui-teng Lin, and Thomas F. George. Dec 80, 41p Rept no. TR-9
Contracts N00014-80-C-0472, F49620-78-C-0005

A classical model system, consisting of a diatomic molecule chemisorbed on a solid surface and subjected to infrared laser radiation, is presented. A set of coupled equations of motion characterized by the many-body effects of the surface atoms is reduced to the Langevin equations of a two-body problem in transformed coordinates. The surface-induced damping factor and frequency red-shift of the pumped mode are introduced by using a Wigner-Weisskopf-type approximation. The asymmetric forms of the power absorption and the quantized cross section due to the nonlinear effects of the anharmonicity are shown. The energy absorption profiles (energy absorbed vs time), which are universal for any ranges of laser intensity (i.e., as the intensity changes the profile remains the same provided the time scale is changed appropriately), are plotted for different sets of the damping factor and the detuning. It is found that much longer time scales (microsecond) are required for low-power excitations than for the high-power cases. The advantages and difficulties of the normal-mode method and the numerical method are discussed, and a new set of coupled equations in the rotating frame are developed.

AD-A094 337/3 PC **A04**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Laser-Stimulated Surface Processes and Heterogeneous Catalysis.
Doctoral thesis,
Jui-Teng Lin. Nov 80, 68p Rept no. TR-8
Contract N00014-80-C-0472

A theoretical study of laser-stimulated surface processes (LSSP), motivated by potentialities in the areas of chemical industrial, material science and academic research, is presented. The possibility of the new phenomena of laser-controlled surface processes (migration, recombination, desorption and heterogeneous rate processes) is demonstrated within the framework of model systems which create a theoretical foundation for an understanding of the quantitative and semi-quantitative aspects of LSSP, and provide possible mechanisms and suggest relevant measurements of LSSP with applications to laser-catalyzed rate processes. For a heterogeneous system of LSSP, the major features and the dynamical behavior are studied by both classical and quantum models, where each model provides one or more mechanism of the processes. They include: microscopic model Hamiltonians (in the Heisenberg-Markovian picture) of multiphoton-multiphonon processes; quantum dynamical model (in the Schrodinger picture) of the selective vs nonselective nature of LSSP; Pauli master equations in photon-energy space for the energy distributions and associated desorption probabilities of the adspecies; phenomenological classical models for the average power absorption of the system, where the many-body effects of the surface atoms are replaced by the damping factor and the frequency-shift; the generalized Langevin theory for the dynamical behavior of LSSP; coupled Newton's equations of a model CO/Ni adspecies/surface system for the numerical simulation of the atom amplitudes and the energies stored in the bonds; and semiclassical model for the laser-selective nature via the multiphonon coupling strength and the internal resonant condition.

AD-A094 338/1 PC **A03**/MF **A01**
Virginia Univ., Charlottesville. Dept. of Chemistry.
Electron-Rich Carboranes. Studies of a Stereochemically Novel System, (CH3)4C4B7H9, and 11-Vertex Arachno Cluster.
Interim rept.,
David C. Finster, and Russell N. Grimes. Jan 81, 48p Rept no. TR-37
Contract N00014-75-C-0305

The controlled degradation of (CH3)4C4B8H8 (I) in 95% ethanol in air gives (CH3)4C4B7H9 (II). Electrophilic bromination of II produces 11-Br-(CH3)4C4B7H8 (III), which is shown in an X-ray diffraction study to have an open face; compounds II and III can be described as 11-vertex arachno cages. Deprotonation of II with NaH in THF generates the monoanion (CH3)4C4B7H8(-)(IV) from which the CH proton on the bridging group has been removed. Protonation of IV gives a new isomer of (CH3)4C4B7H9 (V), whose 11B and 1H FT NMR spectra indicate a substantially different cage geometry from that of II. The molecular structures of II-V and pathways for their interconversion are discussed inlight of NMR, ir, mass spectroscopic, and X-ray evidence. Crystal data for III: BrC8B7H20; mol wt 271.84, space group P 1-bar, Z = 2; a = 7.764(3), b = 8.352(5), c = 12.317(6)A; alpha = 94.53(5), beta = 95.41(5), gamma = 120.51(5) deg; V = 678 A-cubed; R = 0.057 for 1404 independent reflections having (F sub o) - squared > 3 sigma (F sub o) squared. (Author)

AD-A094 384/5 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Correlation Methods in the Chemistry Laboratory.
Interim technical rept.,
Gary M. Hieftje, and Gary Horlick. 30 Jan 81, 28p Rept nos. TR-36, 44
Contract N00014-76-C-0838

The basic operations inherent in the correlation process were reviewed and the range of application of correlation methods examined. Specific examples of how correlation could be used in the chemical laboratory were provided, and references were cited where additional information on correlation could be found. (Author)

AD-A094 391/0 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Picosecond Laser Studies of Excited State Proton Transfer.
Final rept. 1 Sep 77-30 Sep 80,
Kenneth B. Eisenthal. 30 Sep 80, 20p AFOSR-TR-81-0022
Grant AFOSR-77-3407

Picosecond laser techniques were both used and developed to obtain new information on ultrafast molecular processes in liquids. From these studies, primarily of organic molecules, were have gained insight into: the physical and chemical pathways by which excited state molecules dissipate their energy by proton and electron transfer phenomena, the nature of intermolecular motions (cage effects in chemical reactions) and intramolecular motions about methylene groups, photodissociation of excited molecules and energy relaxation in the fragments generated, e.g. diphenylcarbene, the photoionization and subsequent electron solvation dynamics of pyrene in alcohols. The information we have obtained has important implications in the photostability of dye lasers and polymer systems, the development of new lasers based on the generation of large excited state populations in transient species; and the general effects of intense lasers on materials. (Author)

AD-A094 392/8 PC **A02**/MF **A01**
Georgetown Univ., Washington, DC. Dept. of Chemistry.
Double Layer Structure and Electrode Kinetics.
Final rept. 15 May 76-30 Sep 80,
Robert de Levie. 30 Sep 80, 6p AFOSR-TR-81-0023
Grant AFOSR-76-3027

The modular systems formalism for the description of the admittance of electrode kinetics was applied to membranes, especially to the cases in which membrane-soluble ions cross the membrane, or where ion transport is facilitated by cation carriers, or proton transport by weak acids. The expressions include the effects of the ionic displacement current, which was studied separately in greater detail. Two manuscripts surveyed double layer effects on membranes and at electrodes, while an extensive review discussed the mathematical modeling of ion transport through membranes. Some problems were treated which occur in the application of admittance measurements to a fixed or rotating disk electrode. (Author)

AD-A094 393/6 PC **A02**/MF **A01**
Harvard Coll. Observatory, Cambridge, MA.
High Resolution Vacuum Ultraviolet Spectroscopy of Small Molecules.
Final rept. 1 Oct 79-30 Sep 80,
W. H. Parkinson, D. E. Freeman, and K. Yoshino. 30 Sep 80, 8p AFOSR-TR-81-0024
Grant AFOSR-80-0018

A 6.65 metre vacuum spectrograph operated at a wavelength resolution of 0.0006 nm has been used to study the spectroscopy of rare gas molecules relevant to the development of intense vacuum ultraviolet radiation sources and lasers, and photoabsorption and predissociation processes in molecular nitrogen, which in the 80-100 nm region are important sources of upper atmospheric atomic nitrogen. Absorption spectra of XeHe, XeNe, XeAr, XeKr, KrHe, KrNe, and KrAr have been photographed and interpreted as arising from transitions from bound ground states to bound or free excited electronic states of these van der Waals molecules; bound excited states have been found for XeKr and XeAr. The emission spectrum of diatomic argon in the 100-150 nm region has been found to consist of four band systems all terminating on the ground electronic state; the only discrete band system, that emitted from the lowest excited state, has been analyzed rotationally and characterized spectroscopically as a triplet state for which the long range potential has been estimated. The absorption spectrum of atomic krypton in the 84-124 nm region has been obtained, and excited Rydberg states with principal quantum number as high as 60 have been assigned; the

lowest two ionization energies have been accurately determined. High resolution absorption spectra of dipole allowed transition in molecular nitrogen, from the ground state to excited Rydberg and valence states have been rotationally analyzed. Some large anomalies in frequency spacings and relative intensities have been interpreted in terms of strong homogeneous perturbations rather than predissociations. (Author)

AD-A094 400/9 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Photoluminescence Study of Thermal Conversion in Gallium Arsenide.
Master's thesis,
John McLemore Anderson. Dec 80, 86p Rept no. AFIT/GEO/PH/80-1

A photoluminescence study was made of undoped and chromium-doped gallium arsenide annealed in three different atmospheres: argon, hydrogen, and nitrogen. The purpose of this study was to determine the causes of thermal conversion and to examine the effects of different annealing atmospheres on this problem. It was found that conversion can be due to any of the a number of causes, rather than to one common cause. Conversion in the samples studied was associated with carbon impurities in undoped samples and with silicon in doped samples. Although manganese was found to be present in many samples, no clear association of manganese with type conversion was found. It was found that annealing under nitrogen gas was the most effective way of maintaining a semi-insulating surface layer. (Author)

AD-A094 404/1 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Measurement of Cl2 Concentration in a XeCl Hollow Cathode Discharge Including the Effect of H2 Addition.
Master's thesis,
Jerry D. Winegarden. Dec 80, 102p Rept no. AFIT/GEP/PH/80-12

A hollow cathode discharge tube was used to excite a Hcl/Xe/Ne gas mixture of 4%/16%/80%. Total gas pressures of 4 and 6 Torr and discharge currents ranging from 200, 300, 400, and 500 mA were investigated. A photon counting technique was used in a U.V. absorption spectroscopy experiment to determine the partial pressure of Cl2 as a function of current and pressure and for monitoring the 308 mn emission of XeCl for these conditions. XeCl emission decreased with time as a result of the introduction of additional chlorine to the system from the discharge tube surface. Both this surface supplied chlorine and that originating from the HCl in the original mix resulted in a substantial concentration of Cl2 being observed. The surface desorption rate increased with current and was dramatically enhanced by the addition of small amounts of H2 to the discharge mix. (author)

AD-A094 418/1 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Theoretical and Experimental Study on The Application of Stimulated Raman Spectroscopy.
Master's thesis,
David Charles Slater. Dec 80, 140p Rept no. AFIT/GEP/PH/80-9

An analysis of the stimulated Raman scattering process has been carried out for three variational techniques of stimulated Raman spectroscopy (SRS) using low power CW lasers and synchronous detection techniques. The three variational techniques of SRS examined are direct SRS, Raman-Induced Kerr Effect (RIKES) and Optically Heterodyned RIKES (OHD RIKES). In this analysis the Raman scattered signals for all three variational techniques were derived using Maxwell's equations for both amplitude and phase modulation techniques. The noise contributions for each technique were also examined. It was found that the main source of noise for each technique was due to probe laser intensity fluctuations.

AD-A094 441/3 PC **A02**/MF **A01**
School of Aerospace Medicine, Brooks AFB, TX.
Field Testing of Solid-Sorbent Sampling--Colorimetric Analysis for Hydrazine in Air.
Interim rept. 1 Apr 78-30 Nov 79,
Leonard J. Luskus, and Herman J. Kilian. Oct 80, 14p Rept no. SAM-TR-80-38

A field sampling and analytical method for measuring hydrazine in air at and below the TLV concentration of 0.1 ppm was developed at USAFSAM. The method uses the Hach field water-analysis kit to analyze samples collected on acidified firebrick sorbent packed in a glass tube through which air is pulled by a miniature personal sampling pump. This report presents the results of a collaborative field study done by 13 participating organizations to validate this method for field use. The study showed that relatively inexperienced analysts had satisfactory results when using this method.

AD-A094 469/4 PC **A04**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Saturation of Energy Levels in Analytical Atomic Fluorescence Spectrometry. II. Experimental.
Interim technical rept.,
Dorys Rojas de Olivares, and Gary M. Hieftje. 30 Jan 81, 58p Rept nos. TR-34, 42
Contract N00014-76-C-0838
See also report dated Dec 76, AD-A094 469.

A theoretical Model was proposed to describe the saturation of atomic energy levels under conditions of intense but brief irradiation by a suitable excitation source. The experimental verification of that model is presented herein. In this study, the effects on dye laser-induced saturation of analyte concentration, flame composition and atomic properties of the elements were all examined and quantitated in terms of a measurable parameter, the saturation spectral power density (SSPD). The results of those studies reveal that SSPD is relatively independent of analyte concentration and flame composition but is a strong function of the nature of each particular atomic transition employed. Moreover, because of strong quenching in most analytical flames, a simple steady-state model for saturation applies even for breif, 5.6 ns. pulses from a nitrogen-laser pumped dye laser. Most importantly, it is shown that reliable values for the SSPD can be obtained only through careful experimental design; considerations important in such measurements are therefore carefully detailed. (Author)

AD-A094 473/6 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
Quenching of Acetone Triplets by 1,3-Dienes in Fluid Solution,
Nicholas J. Turro, and Yoshifumi Tanimoto. 23 Apr 80, 7p AFOSR-TR-81-0037
Grant AFOSR-78-3502
Pub. in Jnl. of Photochemistry, v14 p199-203 1980.

No abstract available.

AD-A094 474/4 PC **A02**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Chemistry.
The Electrical Double Layer at Mercury in Room Temperature Aluminum Chloride: I-Butylpyridinium Chloride Ionic Liquids,
R. J. Gale, and R. A. Osteryoung. 13 Feb 80, 4p AFOSR-TR-81-0038
Contract F49620-79-C-0142
Pub. in Electrochimica Acta, v25 p1527-1529 1980.

No abstract available.

AD-A094 475/1 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Saturation Broadening in Flames and Plasmas as Obtained by Fluorescence Excitation Profiles,
N. Omenetto, J. Bower, J. Bradshaw, S. Nikdel, and J. D. Winefordner. 11 Feb 80, 7p AFOSR-TR-81-0044
Contracts F44620-76-C-0005, F33615-78-C-2038
Pub. in Laser Probes for Combustion Chemistry, ACS Symposium Series, n134 p195-198 1980.

No abstract available.

AD-A094 476/9 PC **A02**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Chemistry.
An Investigation into the Electrochemical Oxidation of Some Aromatic Amines in the Room-Temperature Molten Salt System Aluminum Chloride-n-Butylpyridinium Chloride,
J. Robinson, and R. A. Osteryoung. 8 Jun 79, 8p AFOSR-TR-81-0040
Contract F49620-79-C-0142
Pub. in Jnl. of the American Chemical Society, v102 n13 p4415-4420, 18 Jun 80.

No abstract available.

AD-A094 486/8 PC **A02**/MF **A01**
Chicago Univ., IL. James Franck Inst.
Experimental and Theoretical Studies of Intramolecular and Intermolecular Dynamics.
Final rept. 1 Oct 79-30 Sep 80,
Stuart A. Rice. 30 Sep 80, 12p AFOSR-TR-81-0062
Grant AFOSR-80-0004

Significant progress has been made in both experimental and theoretical studies of intramolecular and photochemical processes. The concept of kolmogorov entropy has been extended to the quantum mechanical case and has been used to interpret the nature of chaos in quantum mechanical systems. A detailed study of radiationless processes in cold isolated naphthalene was completed and in which the first evidence for a promoting mode was identified. Striking quantum mechanical effects in very low energy collisions of atoms with polyatomic molecules was discovered. A detailed study of collision induced energy exchange in electronically excited pyrazine was completed and which resulted in the development of a correlation type theory of the rules governing such processes. Finally, a joint theoretical and experimental study of the effect of initial rotational state selection of photophysical and photochemical processes has been completed. (Author)

AD-A094 506/3 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Nonsteady-State Molecular Luminescence Behavior under Narrowband Laser Excitation,
G. D. Boutilier, N. Omenetto, and J. D. Winefordner. 15 Oct 79, 8p AFOSR-TR-81-0048
Contract F44620-76-C-0005
Pub. in Applied Optics, v19 n11 p1838-1843, 1 Jun 80.

No abstract available.

AD-A094 508/9 PC **A02**/MF **A01**
State Univ. of New York at Buffalo. Dept. of Chemistry.
Electrochemical Reduction of Pyridinium Ions in Ionic Aluminum Chloride: Alkylpyridinium Halide Ambient Temperature Liquids,
R. J. Gale, and R. A. Osteryoung. 18 Oct 79, 8p AFOSR-TR-81-0039
Grant AFOSR-76-2978
Pub. in Jnl. of the Electrochemical Society, v127 n10 p2167-2172 Oct 80. Prepared in cooperation with Colorado State Univ., Fort Collins. Dept. of Chemistry, Contract N00014-77-C-0004.

No abstract available.

AD-A094 511/3 PC **A06**/MF **A01**
Battelle Columbus Labs., OH.
Computational Study of Nonadiabatic Effects in Atom-Molecule Reactive Scattering.
Final rept. 15 Mar 79-1 Oct 80,
Michael J. Redmon. 10 Dec 80, 114p AFOSR-TR-81-0007
Contract F49620-79-C-0050

This report describes a research program that attempts to bring together the computational tools necessary for studying nonadiabatic transitions in atom-diatomic molecule collisions. Recent results, including rate constants for state-to state reactions involving F+H2(V=0) and H+H2(V=1), are presented. Systematic approaches to fitting potential energy surfaces obtained from ab initio quantum chemistry are investigated. A practical formalism for accurately treating nonadiabatic electronic couplings is developed, and tested in an application to electronic quenching in K+H collisions. It is argued that these developments provide the theoretical tools necessary for a computational study of rotational, vibrational and electronic transitions in selected atom-diatomic molecule reactions. (Author)

AD-A094 512/1 PC **A05**/MF **A01**
Battelle Columbus Labs., OH.
Molecular Interactions with Many-Body Perturbation Theory.
Interim rept.,
Rodney J. Bartlett. 15 Sep 80, 94p AFOSR-TR-81-0009
Grant AFOSR-78-3661

Binding energies including valence-shell electron correlation were obtained from many-body perturbation theory (MBPT) for diborane, borane carbonyl, and borzane. Results were obtained for basis sets of double zeta quality and for basis sets with polarization functions added on all atoms. The binding energies were found to be (respectively) 35, 21, and 30 kcal/mole. Correlation effects account for 48, 62, and 32 percent of the binding. The size-consistent nature of the MBPT method enables the computation of enthalpies of reaction for four different reactions involving monoborane, diborane, carbon monoxide, and borane carbonyl. When the theoretical values are corrected for vibrational zero-point energies and the experimental data are adjusted for temperature effects, the results agree (within 5 percent) and thus confirm the set of experimental enthalpies for the association reaction yielding diborane. The result for the binding energy of borazane constitutes a prediction in the absence of an experimental value. (Author)

AD-A094 516/2 PC **A02**/MF **A01**
Michigan State Univ., East Lansing. Dept. of Chemistry.
Correlation of Electrode Kinetics with Surface Structure.
Final rept. Oct 77-Sep 80,
Michael J. Weaver. Sep 80, 24p AFOSR-TR-81-0014
Grant AFOSR-77-3408

The overall objective of this research is to develop an understanding of the relationships between the kinetics and mechanisms of some simple heterogeneous electron-transfer reactions and the molecular structure of the reactant and the electrode-solution interface. Emphasis is being placed on studies of transition-metal redox couples involving substitutionally inert complexes in aqueous media at a number of solid metals as well as at mercury electrodes. These reactions provide excellent model systems for studying structural effects in electron transfer, since they are mechanistically simple and either inner- or outer-sphere reaction mechanisms can be induced, depending on the ability of the coordinated ligands to bind to the electrode surface. Problems that were addressed included: (1) the effects of varying the nature of the metal surface upon the rates of inner-and outer-sphere reactions; (2) the influence of ionic specific adsorption upon the reactivities of outer-sphere pathways; (3)determination of the influence of reactant specific adsorption to the reorganization energy barrier for electron transfer, and (4) elucidation of the role of reactant-solvent interactions in redox kinetics and thermodynamics.

AD-A094 521/2 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Dynamical Model of Selective Versus Non-Selective Laser-Stimulated Surface Processes,
Jui-teng Lin, and Thomas F. George. 17 Apr 80, 9p AFOSR-TR-81-0041
Contracts F49620-78-C-0005, N00014-80-C-0472
Pub. in Surface Science, v100 p381-187 1980.

No abstract available.

AD-A094 522/0 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Determination of Flame and Plasma Temperatures and Density Profiles by Means of Laser-Excited Fluorescence,
J. Bradshaw, S. Nikdel, R. Reeves, J. Bower, and N. Omenetto. 11 Feb 80, 7p AFOSR-TR-81-0051
Contract F44620-76-C-0005
Pub. in ACS Symposium, n134 p199-203 1980.

No abstract available.

AD-A094 526/1 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Physics.
Role of Na-Xe Molecules in Spin Relaxation of Optically Pumped Na in Xe Gas,
N. D. Bhaskar, M. Hou, M. Ligare, B. Suleman, and W. Happer. 18 Jun 80, 8p AFOSR-TR-81-0064
Grant AFOSR-79-0082
Pub. in Physical Review A, v22 n6 p2710-2716 Dec 80.

No abstract available.

AD-A094 527/9 PC **A02**/MF **A01**
Hull Univ. (England). Dept. of Chemistry.
Addition of n-Pentane to Slowly Reacting Mixtures of Hydrogen + Oxygen at 480C,
Roy R. Baldwin, Joan P. Bennett, and Raymond W. Walker. 7 Aug 79, 20p AFOSR-TR-81-0027
Grant AFOSR-77-3215
Pub. in J.C.S. Faraday I, v76 p1075-1098 1980.

No abstract available.

AD-A094 543/6 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Correlation-Based Approaches to Time-Resolved Fluorimetry.
Interim technical rept.,
G. M. Hieftje, and G. R. Haugen. 30 Jan 81, 28p
Contract N00014-76-C-0838

In the past two years, several new techniques have been introduced for the measurement of nanosecond and subnanosecond fluorescence processing. Because these methods use relatively simple instrumentation and offer exceptional time resolution and accuracy, they compete favorably with more established approaches. In this paper, an introduction to these new methods is provided and their capabilities and limitations assessed.

AD-A094 545/1 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
Observation of One- and Two-Electron Transfer from Noble-Gas Atom to Highly Stripped Carbon Ions,
J. Goldhar, R. Mariella, Jr., and A. Javan. 1 Mar 76, 3p
Contract N00014-76-C-0447
Availability: Pub. in Applied Physics Letters, v29 n2 p96-98, 15 Jul 76 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 549/3 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
XeF Ground-State Dissociation and Vibrational Equilibration,
S. F. Fulghum, M. S. Feld, and A. Javan. 30 Apr 79, 3p
Contract N00014-76-C-0447
Availability: Pub. in Applied Physics Letters, v35 n3 p247-249, 1 Aug 79 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 555/0 PC **A08**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The Effect of Flow Rate and Canister Geometry on the Effectiveness of Removing Carbon Dioxide with Soda Lime.
Master's thesis,
Richard Steven Ploss. Sep 80, 155p

A continuation of experiments initiated by Commander Calvin G. Miller, USN, on the effect of flow rate, flow geometry and environment temperature on the effectiveness of a commercial soda lime, Sodasorb, to absorb carbon dioxide from a mixture of carbon dioxide and air is described. Modifications to cylindrical four-inch inside-diameter canisters with three length-to-diameter ratios of 1.225, 1.60 and 2.125 were tested. These modifications were in the form of one-half inch axial spacers or annular rings located within the soda lime bed. Steady flow rates of approximately 1, 2 and 3 SCFM of saturated air at one atmosphere and environment temperatures of 40 deg F, 55 deg F and 70 deg F were used. Temperature and pressure distributions through the soda time bed were measured. The regenerative properties of the soda lime were tested for a length-to-diameter ratio of 2.125, a flow rate of approximately 2 SCFM and an environment temperature of 70 deg F. (Author)

AD-A094 561/8 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The Effect of Canister Geometry on the Effectiveness of Removing Carbon Dioxide with a Constant Mass of Soda Lime.
Master's thesis,
Peter Eric Louden. Dec 80, 81p

An investigation was conducted of the effect of canister geometry on the effectiveness of a constant mass of a commercial soda lime, Sodasorb, to absorb carbon dioxide from a mixture of carbon dioxide and air. A comparison of cylindrical canisters with length-to-diameter ratios of 0.15, .029, 0.44, 0.80, 1.16, and 2.125 was completed with a constant mass of three pounds of Sodasorb. Annular ring baffles and disk baffles were employed to get more evenly distributed usage of the Sodasorb with the results compared to the 'straight' through type canisters for the above L/D ratios. A steady flow rate of approximately 2.1 SCFM of saturated air with six percent carbon dioxide at one atmosphere and environment temperature of 70 degrees F was used. It was found that annular ring baffles and disk baffles increased the effectiveness significantly. (Author)

AD-A094 583/2 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Application of Laser-Excited Atomic Fluorescence Spectrometry to the Determination of Nickel and Tin,
M. S. Epstein, J. Bradshaw, S. Bayer, J. Bower, and E. Voigtman. 12 Jul 79, 7p AFOSR-TR-81-0049
Contract F44620-76-C-0005, Grant NSF-CHE77-23138
Pub. in Applied Spectroscopy, v34 n3 p372-376 1980.

No abstract available.

AD-A094 585/7 PC **A02**/MF **A01**
Ohio State Univ., Columbus. Dept. of Chemistry.
Electrocatalysis of Oxygen Reduction. Part III. Selective Reduction to Hydrogen Peroxide or Water Using Polymeric Attachment of Metalloporphyrins,
Armand Bettelheim, Ray J. H. Chan, and Theodore Kuwana. 10 Sep 79, 11p AFOSR-TR-81-0053
Grants AFOSR-78-3672, NSF-CHE76-81591
Pub. in Jnl. of Electroanalytical Chemistry, v110 p93-102 1980. See also Part 2, AD-A082 681.

No abstract available.

AD-A094 587/3 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Chemistry.
Dynamical Model of Selective vs. Nonselective Laser-Stimulated Surface Processes. 2. Analytical Methods and Applications to Surface Rate Processes,
Jui-teng Lin, and Thomas F. George. 1980, 14p AFOSR-TR-81-0042
Contract F49620-78-C-0005
Pub. in Jnl. of Physical Chemistry, v84 n22 p2957-2968 1980. See also Part 1, AD-A094 521.

No abstract available.

AD-A094 588/1 PC **A02**/MF **A01**
British Columbia Univ., Vancouver. Dept. of Chemistry.
Deactivation of O2 A Triplet Sigma U Plus by O2, O and Ar,
R. D. Kenner, and E. A. Ogryzlo. 7 Dec 79, 9p AFOSR-TR-81-0043
Grant AFOSR-79-0088
Pub. in International Jnl. of Chemical Kinetics, v12 p501-508 1980.

No abstract available.

AD-A094 590/7 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
The Reliability of Detection Limits in Analytical Chemistry,
J. L. Ward, and J. D. Winefordner. 14 Jul 80, 6p AFOSR-TR-81-0047
Contract F49620-80-C-0005

Pub. in Analytical Letters, v13 nA14 p1293-1297 1980.

No abstract available.

COO-1713-93 PC **A02**/MF **A01**
Washington Univ., St. Louis, MO.
Reaction Studies of Hot Silicon and Germanium Radicals. Progress Report, September 1, 1979-August 31, 1980.
P. P. Gaspar. 31 Aug 80, 25p
Contract AS02-76ER01713

The experimental approach to attaining the goals of this research program is briefly outlined and the progress made in the last year is reviewed in sections entitled: (a) primary steps in the reaction of recoiling silicon and germanium atoms and the identification of reactive intermediates in the recoil reactions; (b) thermally induced silylene and germylene reactions; (c) ion-molecule reaction studies. (ERA citation 06:004273)

GKSS-79/E/46 PC **A02**/MF **A01**
Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht-Tesperhude (Germany, F.R.). Inst. fuer Werkstofftechnologie und Chemie.
Determining Tritium Contents in Elbe Water.
H. H. Schreier, R. Diehl, and S. Boschatzky. 1979, 24p
In German.
U.S. Sales Only.

Tritium measurements of different local and temporal Elbe river water samples were executed. The comparison of untreated, filtered and distilled samples confirmed the nead of distillation step. The average tritium activity was found to be 300 and 570 pCi/l, respectively. Some periodical peaks, however, reached values of about 4000 pCi/l. (Atomindex citation 11:531090)

INIS-mf-5496 PC **A05**/MF **A01**
Technische Univ., Graz (Austria). Inst. fuer Allgemeine Chemie, Mikro- und Radiochemie.
Radiochemical Studies of the Enrichment and Determination of Trace Amounts of Metals in Refractory Matrices Using 1-(2-Pyridylazo)-2-Naphthol.
A. Bernkopf. 81p
In German.Thesis.
U.S. Sales Only.

A new and simple method for extraction and determination of trace amounts of iron and cadmium in a molybdenum matrix is presented. The method is based on liquid-liquid extraction, followed by liquid-solid separation, using 1-(2-pyridylazo)-2-naphthol as a selective reagent for the metal ions. The extraction efficiency was studied in pure aqueous solutions of cadmium and iron using a tracer technique; the parameters for quantitative extraction were determined. End analysis of iron and cadmium was performed both by X-ray fluorescence and by atomic absorption spectroscopy. Extraction from the molybdenum matrix was carried out in alkaline medium owing to the tendency of molybdenum to form heteropoly acids in acid solutions. The following detection limits were obtained: 4 g Cd resp. 6 g Fe by X-ray fluorescence; 0.1 g Cd/ml resp. 0.2 g Fe/ml by atomic absorption spectroscopy. The work closes with a discussion of the advantages and problems of solid extraction methods. (Atomindex citation 11:530486)

INIS-mf-5751 PC **A06**/MF **A01**
Katholieke Univ. Nijmegen (Netherlands).
Hyperfine Spectrum of Hydrogen Dimers. Investigation of the Intermolecular Potential.
J. F. C. Verberne. 1979, 119p
Thesis.
U.S. Sales Only.

The author's aim was to obtain the level scheme for the hydrogen dimers and to investigate the angle-dependent interactions by analyzing the zero-magnetic-field hyperfine spectrum of the ortho-ortho and ortho-para species. The results were tested by several recent semi-empirical and ab initio potentials. (Atomindex citation 11:529455)

INIS-mf-5767 PC **A05**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Investigation of Reactions of the Hydroperoxy Radical Using a Combined ESR-LMR Spectrometer.
F. Temps. Aug 79, 84p
In German.Thesis.
U.S. Sales Only.

The velocity constants of the reactions O + HO sub 2 implies OH + O sub 2 and NO + HO sub 2 implies OH + NO sub 2 were determined using a combined ESR-LMR-spectrometer. This combination allowed us to measure simultaneously the time dependence of the concentration profiles of atoms and radicals. (Atomindex citation 11:529451)

INIS-mf-5768 PC **A07**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Measurement of the Energy Dependence of the Integral Scattering Cross Section for Electronic Excitation in Alkali-Hg Collisions by Light Spectroscopy.
U. Krause. Sep 79, 128p
In German.Thesis.
U.S. Sales Only.

Integral cross sections were measured for alkali-Hg collisions as well as for the light emission induced by alkali-CO sub 2 collisions. The low-lying levels of the alkali atoms are preferably excited. Those excitations were investigated in detail. The results were interpreted in terms of the semi-classical Landau-Zener-Stueckelberg theory using the adiabatic potential curves given by Dueren. (Atomindex citation 11:529394)

INIS-mf-5769 PC **A08**/MF **A01**
Max-Planck-Inst. fuer Stroemungsforschung, Goettingen (Germany, F.R.).
Investigation of the Long Range Anisotropic Potential of KCl and CsCl in Rotational Inelastic Collisions with Rare Gases and the Determination of Quadrupole Moments of Molecules from Rotational Inelastic Scattering Cross Sections of CsF.
G. Meyer. Oct 79, 153p
In German.
U.S. Sales Only.

The interaction potentials for rotational inelastic collisions between molecules and atoms are studied, and the quadrupole moments of molecules are investigated. Absolute rotational inelastic cross sections are analyzed for the rotational transitions (2,0) (3,0) and (3,0) (4,0) observed in collisions of alkali halogenides with the atoms of a gas target of known density. Model calculations allow conclusions on the odd terms of used potentials. (Atomindex citation 11:529409)

INIS-mf-5770 PC **A10**/MF **A01**
Odense Univ. (Denmark).
Surfaces of Solids and Their Interactions with Gaseous Ambients. An Introduction to the Theory and Experimental Methods, with Some Examples.
P. Morgen. Oct 77, 206p
U.S. Sales Only.

The physics and chemistry of ambient gases interacting with solid surfaces are discussed. The necessary theory and experimental techniques and apparatus used are described in detail. Results are presented for two semiconductor materials, silicon and zinc oxide. (Atomindex citation 11:529513)

KFK-tr-633 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Internationales Buero/Uebersetzergruppe.
Extraction of Macroamounts of Uranium (IV) And Plutonium (IV) From 0.15-1 M Aqueous Nitric Acid Solutions Using a 30% Solution of Tri-N.-Buty' Phosphate in N.-Dodecane.
V. E. Vereshchagin, and E. V. Renard. 1979, 15p
In German, RA, Radiokhimiya, 21 n3 PS386-S393 1979.
U.S. Sales Only.

The isothermal lines (26 +- 1 exp 0 C) determined for the extraction of macroamounts of uranium (VI) (0-300 g/l) and plutonium (IV) (0.5-100 g/l in aqueous phases in equilibrium) from 0.15, 0.3, and 1 M nitric acid solutions with 30% TBP in n.-dodecane are presented in graphical form. In weak nitric acid solutions (0.15, 0.3 M), the 'self-salting-out' effect of plutonium was observed even in the presence of considerable amounts of uranium (VI). In 0.5 M nitric acid solutions, the effects of 'self-salting-out' and saturation of the extracting agent with metal compensate each other, and the plutonium distribution coefficient is independent of its concentration in the aqueous phase. The presence of uranium in the system has a dual effect on the behaviour of plutonium. In weak acid solutions (0.15 and 0.3 M), uranium in concentrations up to 15-20 g/l promotes plutonium extractions while in 0.5 and 1 M acid solutions even small amounts of uranium (VI) strongly reduce plutonium extraction. The isothermal lines can be described by empirical formulas with accuracies of +- (5-10)%. (Atomindex citation 11:530694)

KFK-tr-635 PC **A02**/MF **A01**
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Internationales Buero/Uebersetzergruppe.
Radiochemical Investigation of the Coprecipitation of Microamounts of Hydrolysing Elements with Metal Hydroxides and Oxides. Pt. 4. Coprecipitation of Tin (IV).
V. I. Plotnikov, and I. I. Safonov. 1979, 12p
In German, RA, Radiokhimiya, 21 n3 PS343-S348 1979.
U.S. Sales Only.

The coprecipitation of tin (IV) (between 10 mu g and 7.44 mg) with hydroxides of Fe(III), Ga, Th, Al, Cr(III), Be, Cd, and Mg was investigated in dependence of the pH of the solution. It was shown that coprecipitation of tin (IV) with all metal hydroxides investigated starts at the same time as the precipitation of these hydroxides. If the solid phase of the collector is formed in the range of tin (IV) ion hydrolysis, there is an acido-basic interaction with the hydrolysed ions of the macrocomponent prior to the onset of precipitation. It was also shown that fractionated separation of the metal hydrides, which were taken in comparable amounts, is only possible if the range from the pH at the onset of precipitation of the hydroxide of the more easily hydrolysed metal to the pH at the end of its precipitation does not interfere with the range of hydrolysis of the other, less easily hydrolysed metal. (Atomindex citation 11:530624)

KFK-tr-636 PC **A02**/MF **A01**
Radiochemical Investigation of the Coprecipitation of Microamounts of Some Hydrolyzable Elements with Metal Hydroxides and Metal Oxides. Pt. 5. Coprecipitation of Iron (III).
V. I. Plotnikov, and I. I. Safonov. 1979, 11p
In German, RA, Radiokhimiya, 21 n3 PS349-S354 1979.
U.S. Sales Only.

Investigation of the coprecipitation of various amounts of iron (III) (between 1 mu g and 3.5 mg) with hydroxides of Sn(IV), Ga, Th, Sc, Be, Cd, and Mg as a function of the pH value of the solution. It is shown that the precipitation of the iron (III) with the precipitates of the hydroxides of Be, Cd, Ga, and Sc, which are of lower acidity compared with the microcomponent, is preceded by an acido-basic reaction of Fe(III) with the ions of the macrocomponent. The beginning of this reaction has been observed to coincide with the occurrence of its primary hydrolytical forms in the solution. It is furthermore intensified with decreasing difference in the acidic properties of iron (III) and the other element taking part in the reaction. The neutral hydroxide complex Fe(OH) exp 03 is shown to be the principal coprecipitated form of the iron (III). The coprecipitation of microquantities of iron (III) with tin (IV) hydroxide has been chosen as an example to illustrate the effect of additions of Th, Sc, and Be ions equimolar to the collector. The observed quantitative increase of the microcomponent in the solution is suggested to mainly result from the decrease of the hydrolytical degree of precipitation of tin (IV) due to the interaction of the latter with the ions of impurities. (Atomindex citation 11:530688)

KFK-tr-637 PC **A02**/MF **A01**
Radiochemical Investigation of the Coprecipitation of Microamounts of Hydrolysing Elements with Metal Hydroxides and -Oxides. Pt. 6. Coprecipitation of Chromium (III).
V. I. Plotnikov, and I. I. Safonov. 1979, 10p

In German, RA, Radiokhimiya, 21 n3 PS355-S359 1979.
U.S. Sales Only.

The coprecipitation of different amounts of chromium (III) (between 1 mu g and 3.26 mg) with hydroxides of Sn (IV) Fe (III), Th, Be, Cd, and Mg was investigated in dependence of the pH of the solution. It was shown that the acido-basic reaction process of the micro- and macrocomponents is determined by their different acidic properties. The most important coprecipitated type of chromium (III) is the neutral hydroxocomplex Cr(OH) exp 03 . In the pH range of the solution where the microcomponent under investigation does not have a neutral hydrolytic form, its coprecipitation with the precipitate is due to the fact that it appears to react with the collector if there are no positively charged hydroxocomplexes of the macrocomponent in the solution. It is assumed that the reaction of chromium (III) with better hydrolysing elements, e.g. tin (IV) and iron (III) enhances its hydrolysis while reaction with a less well hydrolysing element, e.g. beryllium, hinders its hydrolysis. (Atomindex citation 11:530689)

LBL-11371 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Using Joined Minicomputer-Microcomputer Systems for Intricate Sample and Data Manipulations.
J. D. Meng. Sep 80, 11p CONF-8009117-1
Contract W-7405-ENG-48
International symposium on mini and micro computers, Montreal, Canada, 9 Sep 1980.

We have produced, over the past three years, three automated x-ray fluorescence based elemental analysis systems, that combine a minicomputer and a microcomputer to perform intricate sample and data manipulations. The mini-micro combination facilitates the reuse of sizable sections of hardware and programs for different x-ray analysis projects. Each of our systems has been a step closer to an optimum general solution. The combination reaps economic benefits throughout development, fabrication and maintenance, an important consideration for designers of custom-built, one-of-a-kind data analysis systems such as these. (ERA citation 06:003953)

LBL-11518 PC **A09**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Wave Mixing Spectroscopy.
R. W. Smith. Aug 80, 184p
Contract W-7405-ENG-48
Thesis.

Several new aspects of nonlinear or wave mixing spectroscopy were investigated utilizing the polarization properties of the nonlinear output field and the dependence of this field upon the occurrence of multiple resonances in the nonlinear susceptibility. First, it is shown theoretically that polarization-sensitive detection may be used to either eliminate or controllably reduce the nonresonant background in coherent anti-Stokes Raman spectroscopy, allowing weaker Raman resonances to be studied. The features of multi-resonant four-wave mixing are examined in the case of an inhomogeneously broadened medium. It is found that the linewidth of the nonlinear output narrows considerably (approaching the homogeneous width) when the quantum mechanical expressions for the doubly- and triply-resonant susceptibilities are averaged over a Doppler or strain broadened profile. Experimental studies of nonlinear processes in Pr exp +3 :LaF sub 3 verify this linewidth narrowing, but indicate that this strain broadened system cannot be treated with a single broadening parameter as in the case of Doppler broadening in a gas. Several susceptibilities are measured from which are deduced dipole matrix elements and Raman polarizabilities related to the exp 3 H sub 4 , exp 3 H sub 6 , and exp 3 P sub 0 levels of the praseodymium ions. (ERA citation 06:004275)

PAT-APPL-6-202 396 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Encapsulation by Entrapment Within Starch Adduct Matrix.
Patent Application,
Baruch S. Shasha. Filed 30 Oct 80, 13p PB81-147472

This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Water-insoluble chemical biological agents to be encapsulated are dispersed in an aqueous paste of a starch-containing material alkoxide. Subsequent addition of selected water-soluble alkali earth metal cations insolubilize the paste, thereby entrapping the agents in a protective matrix. Encapsulation of biologically active compositions provides a shield against hostile environments, improves safety in handling, and slows the release of such compounds to the surrounding medium. Highly volatile liquids are protected against losses by evaporation. Encapsulation also provides protection against decomposition from exposure to ultraviolet light.

PAT-APPL-6-206 404 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Method for Cation Production.
Patent Application,
Abraham Auerbach. Filed 13 Nov 80, 14p AD-D008 015/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention is concerned with a method for the generation of large numbers of cations, and more particularly, with a selective, non-destructive technique of generating large numbers of cations in a flow tube reactor kept at moderate temperatures and pressures. (Author)

PATENT-4 231 891 Not available NTIS
Department of the Navy, Washington, DC.
Solid Compositions for Generation of Gases Containing a High Percentage of Hydrogen or its Isotopes.
Patent,
Werner F. Beckert, William H. Barber, and Ottmar H. Dengel. Filed 16 Jun 78, patented 4 Nov 80, 4p AD-D008 036/6, PAT-APPL-916 423 Supersedes PAT-APPL-916 423-79, AD-D006 935.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Solid compositions which, when heated to initiate the reaction between the components of the compositions, generate gases containing a high percentage of hydrogen or hydrogen isotopes. The compositions comprise intricate mixtures of certain metal powders and certain ammonium or hydrazinium salts. (Author)

PATENT-4 238 472 Not available NTIS
Department of Health and Human Services, Washington, DC.
Radioimmunoassay for Chlorinated Dibenzo-P-Dioxins.
Patent,
Phillip W. Albro, Kun Chae, Michael I. Luster, and James D. McKinney. Filed 27 Nov 78, patented 9 Dec 80, 10p PB81-152712, PAT-APPL-963 784 Supersedes PB-294 679.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The invention provides a double-antibody radioimmunoassay method for the determination of chlorinated dibenzo-p-dioxins, particularly, 2,3,7,8-tetrachlorodibenzo-p-dioxin, in environmental samples including animal tissues such as monkey liver and adipose tissues. The invention includes the preparation of a reproducible antigen, an appropriate radiolabeled hapten, and effective sample extracts. A feature of the assay method is the use of a nonionic detergent (e.g., 'Cutscum' or 'Triton X-305') to solubilize the extremely hydrophobic dibenzo-p-dioxins in a manner permitting their binding by antibodies. The immunoassay is applicable to screening samples in order to minimize the demand for mass spectrometric screening, and to routine monitoring for exposure to known chlorinated dibenzo-p-dioxins in potentially contaminated environments.

PB81-134637 Not available NTIS
National Bureau of Standards, Washington, DC.
The Avogadro Constant,
Richard D. Deslattes. 1980, 27p
Pub. in Annual Review of Physical Chemistry 31, p435-461 1980.

This review of the Avogadro Constant is prepared in response to an invitation from the Editor of the Annual Reviews of Physical Chemistry. It attempts to deal with some aspects of the history in this field of certain conceptual problems and the present state of experimental measurement.

PB81-134645 Not available NTIS
National Bureau of Standards, Washington, DC.
The Accurate Determination of Cholesterol in Serum by Isotope Dilution Gas Chromatography/Mass Spectrometry,
A. Cohen, H. S. Hertz, R. Schaffer, L. T. Sniegoski, and T. Sun. 1978, 3p
Pub. in Proceedings of the Conference on Mass Spectrometry and Applied Optics (26th), St. Louis, MO., May 28-June 2, 1978, p298-300 1978.

A method for the accurate measurement of total cholesterol in serum has been developed to give values against which the accuracy of clinically appropriate reference methods can be judged. Labelled cholesterol (25,26,26,26,27,27,27-d7) was added to serum and the mixture subjected to alkaline hydrolysis. The eight measurements obtained on five different serum pools (1.3 to 3.4 mg cholesterol per ml serum) had an overall relative standard deviation of 0.33%.

PB81-134652 Not available NTIS
National Bureau of Standards, Washington, DC.
Molecular Model of Fracture of Fibrous Polymeric Material,
Anton Peterlin. 1977, 15p
Pub. in Proceedings of the International Conference on Fracture (4th), Waterloo, Canada, June 19-24, 1977, Fracture 1, No. ICF4, p471-485 1977.

The fibrillar model of fibrous structure assumes a dense packing of long and narrow microfibrils into spindle shaped slightly skewed fibrils. The ends of microfibrils located mainly on the outer boundary of the fibrils represent an interruption of the massive axial connection by taut tie molecules. They are prime candidates for microcrack formation upon tensile loading which deforms the sample by shear displacement of adjacent fibrils and microfibrils. The axial and radial growth of microcracks ruptures the tie molecules in its path. The sample fails as soon as one of cracks reaches critical dimensions. The rest of the sample in a new loading run exhibits a lower load-elongation curve but practically the same or even higher strength because the reopening of old microcracks is easier than their initial formation while the growth of microcracks beyond the limits of the first run requires an increased load.

PB81-134660 Not available NTIS
National Bureau of Standards, Washington, DC.
Mechanical Properties of Fibrous Structure,
Anton Peterlin. 1979, 42p
Pub. in Mechanical Structure Ultrahigh Modulus Polymers Symposium, Santa Margherita Ligure, Italy, May 23-27, 1977, Chapter 10 in Ultra-High Modulus Polymers, p279-320 1979.

The drawing of a more or less isotropic semicrystalline polymer solid usually produces a fibrous material with high anisotropy of physical properties. This anisotropy is closely connected with the orientation of chains in crystalline and amorphous regions and with the direction in which the two regions alternate.

PB81-135253 Not available NTIS
National Bureau of Standards, Washington, DC.
Elution Chromatography Method for the Measurement of the Solubilities of Slightly Soluble Organic Liquids in Water,
Frederick P. Schwarz. 1980, 6p
Pub. in Analytical Chemistry 52, p10-15 1980.

A simple method based on liquid phase elution chromatography is presented for determining the solubilities of organic liquids in water. An inert solid support in a transparent tube is coated with the organic liquid. As this solute is eluted with water, a solute depleted zone develops which is different in color than that of the remainder of the support.

Measurement of the rate of progress of the boundary of this zone, the flow rate of water, and the mass of solute coated on the support are sufficient to determine the solubility.

PB81-135261 Not available NTIS
National Bureau of Standards, Washington, DC.
Aspects of Reaction Dynamics at Metal Surfaces,
J. W. Gadzuk, and Horia Metiu. 1980, 4p
Pub. in Proceedings of the International Conference on Solid Surfaces (4th) and the European Conference on Surface Science (3rd) Held at Cannes, France on Sep 22-26, 1980, p168-171 1980.

Key features are presented of a theory of chemical reaction dynamics at metal surfaces which include: (1) diabatic electronic transitions between internal states of an incident beam of atoms or molecules; (2) irreversibility and dissipation through substrate electron-hole pair excitation, (3) quantum modifications to classical trajectories via appropriate Franck-Condon factors.

PB81-139487
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
AWRE (Atomic Weapons Research Establishment) - An Exciting Visit,
P. E. Saalfeld. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p265-267, 30 Jun 80.

The author visited the Atomic Weapons Research Establishment (AWRE) for two reasons. The first being to visit Daly, who heads a division in the large high-energy laser facility and the second, to learn about the chemistry research being conducted at AWRE, which includes the mass spectrometry research.

PB81-142762 Not available NTIS
National Bureau of Standards, Washington, DC.
Proton Transfer Reactions Involving Alkyl Ions and Alkenes; Rate Constants, Isomerization Processes, and the Derivation of Thermochemical Data,
S. G. Lias, D. M. Shold, and P. Ausloos. Apr 80, 9p
Pub. in Jnl. of American Chemical Society 102, n8 p2540-2548, 9 Apr 80.

Rate constants and mechanisms have been determined for proton transfer reactions of the type AH(+) + M yields MH(+) + A, where A is propylene, isobutene, trans-2-butene, cyclopentene and cyclohexene. In order to avoid competing side effects the AH(+) reactant ions are generated in alkanes and alkylhalides. It is observed that the rate constants for exothermic direct proton transfer reactions, from AH(+) to M or from MH(+) to A, are equal to the collision rate only when the total rotational, vibrational and electronic entropy change associated with the reaction is positive, and when the exothermicity of the reaction exceeds 2-4 kcal/mole. On the basis of rate constants in the forward and reverse direction for multiple reaction pairs, internally consistent values are obtained for the proton affinities of propylene, isobutene and cyclopentene.

PB81-142796 Not available NTIS
National Bureau of Standards, Washington, DC.
Monte Carlo Studies of Polymer Chain Dynamics: Lattice Dependence,
David E. Kranbuehl, and Peter H. Verdier. Aug 80, 2p
Pub. in Polymer Preprints 21, n2 p195-196 1980.

The effects of excluded volume interactions upon the limiting long-time relaxation behavior of vector end-to-end length have been obtained by direct computer simulation for lattice-model chains on simple cubic, body-centered cubic, and face-centered cubic lattices. Results have been obtained for chains employing single-bead moves, double-bead moves, and a mixture of both types of move. The chain-length dependence of the lengthening of the longest relaxation times by excluded volume appears to be very similar for all three lattices. For models employing only single-bead or only double-bead move rules, the lengthening is proportional to about the 6/5 power of chain length; for models employing a mixture of both types of move, the lengthening is proportional to about the 3/5 power of chain length. At a given chain length, the lengthening of the longest relaxation time by excluded volume decreases with increasing lattice coordination number.

PB81-142812 Not available NTIS
National Bureau of Standards, Washington, DC.
Backscatter Loss in the X-Ray Continuum,
R. L. Myklebust, D. E. Newbury, and J. A. Small. 1980, 2p
Pub. in Proceedings of the Annual Conference of the Microbeam Analysis Society, Reno, NV., Aug 1980, Paper in Microbeam Analysis, p49-50 1980.

The continuum x-ray loss due to backscattered electrons, R(continuum) has been computed for a large number of elements with the NBS Monte Carlo program for predicting electron trajectories in solids. The results compare favorably with other determinations of R(continuum) appearing in the literature. An empirical expression has been fitted to the R(continuum) values as a function of atomic number and overvoltage that predicts R(continuum) with better than 2% accuracy.

PB81-142838 Not available NTIS
National Bureau of Standards, Washington, DC.
Report on the United States - Japan Cooperative Analysis of Glasses by Secondary Ion Mass Spectrometry,
Dale E. Newbury. 1980, 23p
Pub. in Proceedings of the Secondary Ion Mass Spectrometry Seminar, Tokyo, Japan, Oct 23-27, 1978, p52-74 1980.

Measurements of two glasses by secondary ion mass spectrometry (SIMS) have been made by twenty-two laboratories in the United States, Japan, and Europe. Spectral intensities for positive ions normalized to the ion emission for silicon are reported for each laboratory. The normalized secondary ion yields are found to vary by as much as a factor of fifty when the date of all investigators is compared. For a particular type of instrument, the range is reduced to a factor of five. The range in the normalized yields does not arise because of variation in a single parameter such as primary ion energy. The results imply that quantitative analysis schemes in SIMS must rely on local measurements of relative sensitivity variations.

PB81-142846 Not available NTIS
National Bureau of Standards, Washington, DC.
Energy Flow and Thermal Conductivity in One-Dimensional Harmonic, Isoptically Disordered Crystals,
R. J. Rubin. Nov 80, 11p
Pub. in Chapter 7 in Studies in Statistical Studies, p112-122 Nov 80.

Rubin and Greer established that as the number of defect particles increases, the thermal conductivity increases at least as fast as N(1/2). Subsequently, Verheggen established that the limiting dependence is exactly N(1/2). It appears from the Monte Carlo calculations plotted in fig 2 for the fixed boundary model that the thermal conductivity decreases with increasing N for greater than 800. However, no well-defined power law dependence on N is evident in the range 800 less than N less then 3200 - it is definitely not N(1/2).

PB81-142887 Not available NTIS
National Bureau of Standards, Washington, DC.
Emergence of Periodic Density Patterns.
Final rept.,
R. F. Kayser, and H. J. Raveche. Jul 80, 12p
Pub. in Physical Review B 22, n1 p424-435, 1 Jul 80.

This paper analyzes two recent statistical mechanical theories which study periodic patterns for the local density rho 1(r) as solutions of a nonlinear equation. One theory is based upon the direct correlation function and the other upon the pair correlation function.

PB81-143208 Not available NTIS
National Bureau of Standards, Washington, DC.
Theory of Electron-Hole Pair Excitations in Unimolecular Processes at Metal Surfaces. I. X-Ray Edge Effects,
J. W. Gadzuk, and H. Metiu. Sep 80, 11p
Sponsored in part by National Science Foundation, Washington, DC.
Pub. in Physical Review B, 22, n6 p2603-2613, 15 Sep 80.

A theory of the dynamics of molecular processes at solid surfaces must necessarily deal with those aspects of the solid which provide dissipative or irreversible reaction channels, thus giving the particular process a direction in time. While the heat-bath aspects of the solid are often considered from the phonon point of view, there is increasing speculation that the substrate electron-hole pair excitations may be a significant rate determing factor, at least for metals. This belief is supported by various conclusions which have emerged from theoretical studies of time dependent perturbations acting on extended Fermi systems, as physically realized in core level spectroscopies of solids. The authors present here one phase of a study of surface reaction dynamics, focusing on the irreversible coupling of nuclear motion of an incident beam of atoms or molecules with the substrate electrons. For the cases in which the incident particle undergoes a substrate-induced diabatic transition in its internal electronic state, a sudden localized perturbation on the electrons is turned on. In analogy with the x-ray edge problem, an infrared divergent spectrum of electron-hole pairs is created which could give rise to irreversibility. Specific examples are considered and the ramifications on such observable quantities as sticking coefficients are detailed.

PB81-143216 Not available NTIS
National Bureau of Standards, Washington, DC.
Transport Properties of Annealed, Drawn Low-Density Polyethylene (LDPE).
Final rept.,
F. De Candia, R. Russo, V. Vittoria, and A. Peterlin. 1980, 14p
Sponsored in part by National Council of Research, Milan (Italy).
Pub. in Jnl. of Polymer Science, Polymer Physics Edition 18, p2083-2096 1980.

The specific concentration c(a) of methylene chloride, the zero-concentration diffusion coefficient D(0), and the concentration coefficient gamma (D) of the diffusivity in drawn and annealed LDPE were measured. The influence of the drawing rate, of annealing with the ends of the sample free and fixed and the effects of time of standing at room temperature after annealing were investigated. The observed transport properties are in good agreement with the microfibrillar model of fibrous structure, its relaxation during annealing, and the slow crystallization of relaxed tie-molecules upon standing at room temperature.

PB81-143240 Not available NTIS
National Bureau of Standards, Washington, DC.
Molybdoarsinate Heteropoly Complexes. Structure of the Hydrogen Tetramolybdodimethylarsinate(2-) Anion by X-Ray and Neutron Diffraction,
K. M. Barkigia, L. M. Rajkovic-Blazer, M. T. Pope, E. Prince, and C. O. Quicksall. 1980, 7p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Inorganic Chemistry 19, n9 p2531-2537 1980.

Seven salts of the heteropoly molybdate anions R2AsMo4O15H(-2) (R=CH3, C2H5, C6H5) have been synthesized and characterized by spectroscopic measurements.

PB81-143265 PC**$25.00**
Smithsonian Institution, Washington, DC.
Electrochemistry: History and Theory. Volume I and Volume II.
Wilhelm Ostwald. c1980, 1158p TT-74-52049/01
Trans. of mono. Elektrochemie: Ihre Geschichte und Lehre, Leipzig, v1 1896. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program. Prepared in cooperation with Karl-Marx-Univ., Leipzig (German D. R.).

In the present work the author presents the correlations in the development of scientific views in a

very difficult and controversial subject. The idea is to extract from this history of development the guiding principles for judging and understanding the present level of development of the theory. The history of electrochemistry will help the beginner in the study of this branch of knowledge. Other electrical subjects have seen great scientific and technological development. The development has been presented step by step. A reader without specialized training will encounter no difficulties in understanding this development. He will finally find himself in possession of the most important concepts and knowledge offered by the latest, very rich development of this subject. The English language translation is being published in two volumes. Volume I traces the developments in electrochemistry from early times to Faraday, and Volume II-From Becquerel to the end of 19th century.

PB81-143596 Not available NTIS
National Bureau of Standards, Washington, DC.
The Critical-Region Equation of State of Ethene and the Effect of Small Impurities,
J. R. Hastings, J. M. H. Levelt Sengers, and F. W. Balfour. Nov 80, 37p
Pub. in Jnl. of Chemical Thermodynamics 12, n11 p1009-1045 Nov 80.

Accurate measurements are reported of the equation of state of ethene on 16 isochores within + or - 40 per cent of the critical density and at temperatures from 220 to 303 K. Two samples, one of 99.993 and one of 99.999 moles per cent C2H4, have been used. The principal source of experimental error is found to be impurity. A model for predicting the effect of known small impurities is developed and used to explain qualitatively the observed differences between the results for our two samples as well as those between our own and other recently-reported accurate measurements. The critical-point parameters resulting from the fit are presented. Comparisons are made with two other sets of measurements recently published. The agreement is generally satisfactory.

PB81-143604 Not available NTIS
National Bureau of Standards, Washington, DC.
Longitudinal Acoustic Mode in Helical Polymers: Polyoxymethylene and Isotactic Polypropylene,
J. F. Rabolt, and Bruno Fanconi. 1977, 7p
Pub. in Polymer Letters 15, p121-127 1977.

A longitudinal acoustic mode (LAM) characteristic of polymer crystalline lamellae has been observed in the low frequency Raman spectra of melt crystallized polyoxymethylene and isotactic polypropylene. The shift in peak frequency of the LAM is correlated with an increase in lamella thickness resulting from annealing. Assuming the applicability of the uniform elastic rod model to helical polymers, values of the elastic modulus are derived and found to be much larger than those obtained from x-ray measurements. The possible origins of this discrepancy are discussed.

PB81-144230 Not available NTIS
National Bureau of Standards, Washington, DC.
Fracture of Fibrous Polymers,
A. Peterlin. Nov 78, 6p
Pub. in Polymer Engineering and Science 18, n14 p1062-1067 Nov 78.

The fibrous material obtained by drawing or extrusion exhibits a more than linear increase in the axial elastic modulus with draw ratio, a much slower increase in tensile strength and a decrease in strain to break. The reason for such a behavior is found in the existence of structural defects of fibrous material, which is composed of very long and narrow microfibrillar elements. The process is favored by a high elastic modulus of microfibrils which is practically identical with that of the drawn or extruded sample. Hence the fibrous polymer fails at lower strain the higher its axial elastic modulus, i.e., the higher the draw ratio.

PB81-144248 Not available NTIS
National Bureau of Standards, Washington, DC.
Rapid Solidification,
J. W. Cahn, S. R. Coriell, and W. J. Boettinger. 1980, 15p
Sponsored in part by Defense Advanced Research Projects Agency, Arlington, VA.
Pub. in Proceedings of Laser and Electron Beam Processing of Materials, Boston, MA., November 27-30, 1979, Paper in Laser and Electron Beam Processing of Materials, p89-103 1980.

Rapid solidification phenomena are described in terms of a hierarchy of increasing deviation from equilibrium. Results of morphological stability theory applied to silicon regrowth indicates that factors outside of conventional constitutional supercooling can explain the observed absence of lateral segregation. A model for interface response functions applicable to solute trapping is presented and a thermodynamic limit to the amount of solute trapping, which seems to be operating in some systems, is proposed.

PB81-144263 Not available NTIS
National Bureau of Standards, Washington, DC.
Photoionization and Threshold Photoelectron-Photoion Coincidence Study of Allene from Onset to 20 eV,
A. C. Parr, A. J. Jason, and R. Stockbauer. 1978, 24p
Sponsored in part by Alabama Univ. Research Grants Committee.
Pub. in International Jnl. of Mass Spectrometry and Ion Physics 26, p23-38 1978.

The photoionization efficiency curves for allene and its fragments C3H3(+1), C3H2(+1) and C3H(+1) are given from threshold to 20 eV. The threshold photoelectron spectra and breakdown curves are given over the same energy span. The adiabatic ionization potential is determined to be 9.69 + or - .01 eV and the heats of formation of the fragments are derived from the appearance potentials. Autoionization is found to be an important factor in the parent ionization and fragmentation.

PB81-144271 Not available NTIS
National Bureau of Standards, Washington, DC.
Photoionization and Threshold Photoelectron-Photoion Coincidence Study of Cyclopropene from Onset to 20 eV,
A. C. Parr, A. J. Jason, and R. Stockbauer. 1980, 9p
Sponsored in part by Alabama Univ. Research Grants Committee.
Pub. in International Jnl. of Mass Spectrometry and Ion Physics 33, p243-251 1980.

The photoionization efficiency curves have been obtained for cyclopropene and its fragments C3H3(+1), C3H2(+1), and C3H(+1) from threshold to 20 eV. The threshold photoelectron spectra and breakdown curves are given over the same energy range. The breakdown curve is almost identical to those obtained previously for allene and propyne when put on a common energy scale. This suggests that all three ions isomerize to a common structure before fragmentation.

PB81-144305 Not available NTIS
National Bureau of Standards, Washington, DC.
Elastic Modulus and Strength of Fibrous Material,
A. Peterlin. Feb 79, 7p
Pub. in Polymer Engineering and Science 19, n2 p118-124 Feb 79.

As a rule the large increase of elastic modulus with increasing draw ratio obtainable in highly drawn or extruded semicrystalline polymers is not reflected in a similarly large increase of strength. This is closely connected with the well-known fact that with increasing plastic deformation one obtains fibrous material with decreasing strain to break. These effects are the consequence of fibrous morphology. The axial elastic modulus is mainly caused by the many taut tie molecules which bridge the amorphous layers between consecutive crystal blocks and thus provide an efficient axial force transmission through the sample. The defects at the ends of microfibrils interrupt this transmission because they contain very few if any taut tie molecules connecting the end of microfibril with adjacent fibrillar elments of the sample. As a consequence of the small number of such ends, they only marginally reduce the elastic modulus. But as the mechanically weakest areas of the fibrous material, they drastically depress the strength. They fail as soon as the strain concentration upon them reaches their strain to break. The growth and coalescence of resulting microcracks finally leads to the fracture of the bulk sample as the growing crack reaches critical dimensions.

PB81-144313 Not available NTIS
National Bureau of Standards, Washington, DC.
Accordion-Type Laser-Raman (ALR) Oscillations in Crystalline Polymers,
A. Peterlin. Feb 79, 7p
Pub. in Jnl. of Applied Physics 50, n2 p838-844 Feb 79.

If one interprets the ALR absorption lines of crystalline polymers in terms of oscillating elastic rods of length equal to the thickness L of the crystalline lamellae, or the thickness D of the crystalline core of the lamellae, one obtains for the elastic modulus of these rods values which are substantially higher than the axial elastic modulus E(c) of the crystal lattice. The effect is particularly conspicuous with polymers which in the crystalline state exhibit a helical-chain conformation. The explanation of this effect seems to be the elastic coupling of longitudinal oscillations of chain stems of subsequent lamellae by the intervening amorphous layers. The apparent increase of the ALR oscillation frequency by such coupling is particularly large if the elastic modulus E(a) of the amorphous layers is equal or even higher than that of the crystal lattice. The high value of E(a) derived from such an analysis is a consequence of the very high ALR frequency (about 0.3 THz), which makes the amorphous layer react as a rigid glass.

PB81-145070 PC **A05/MF A01**
District of Columbia Univ., Washington. Water Resources Research Center.
Detailed Report on the Use of Enzymatic Cycling for High Specificity and Precision in the Colorimetric Analysis of Ammonia.
Final rept.,
Frederick W. Carson, and Helen W. Davies. Oct 80, 89p WRRC-21, W81-00987, OWRT-B-011-DC(1)
Contract DI-14-34-0001-9062
Prepared in cooperation with American Univ., Washington, DC. Dept. of Chemistry.

A new method was developed for the determination of ammonium ion concentrations in water in the range of 0.0001-0.00001 molar, based upon enzymatic cycling. The sensitivity of the method could be extended well below the ten nanomoles/sample limit of determination, using suitable modifications of the procedure. This two-step method involved the use of an ammonia-specific glutamate dehydrogenase enzyme reaction with simultaneous oxidation of NADH; followed by an enzymatic cycling reaction to measure oxidized NADH by means of measuring the cycling reaction product, a tetrazolium formazan, in the visible at 600 nm. Using the procedure, linear plots of absorbance versus original ammonium ion concentration had correlation coefficients of 0.997-0.9998. The precision (coefficient of variation) of the method on replicate analyses of samples containing 0.0000441 molar ammonium ion was 2%. A calibration curve for determination of unknown ammonium concentrations could be constructed from standard solutions carried through the procedure. Analysis time per sample was three hours, and all solutions were stable for at least two weeks.

PB81-145468 Not available NTIS
National Bureau of Standards, Washington, DC.
The Value of the Faraday via 4-aminopyridine.
Final rept.,
W. F. Koch. 1980, 16p
Pub. in Proceedings of the Atomic Masses and Fundamental Constants, East Lansing, MI., September 18-21, 1979, Paper in Atomic Masses and Fundamental Constants 6, p157-172 1980.

In 1833, Michael Faraday of the Royal Institution in London formulated the laws of electrolysis revealing the relationship between electric current, time, and chemical equivalent weight (mole). The constant of proportionality, F, has of course been named the Faraday constant and its value is the subject of this presentation. At the last meeting (AMCO-5), preliminary results were reported on the determination of the Faraday constant by way of coulometric titration of 4-aminopyridine performed at Iowa State University. Additional titrations of the same material have since been con-

ducted at the National Bureau of Standards, taking advantage of improved standards of mass, time, voltage and resistance. A reappraisal of the error analysis has also been undertaken in light of further evidence and is reported herein.

PB81-145492 Not available NTIS
National Bureau of Standards, Washington, DC.
Refinement of the Structure of Solid Nitromethane,
S. F. Trevino, E. Prince, and C. R. Hubbard. Sep 80, 6p
Pub. in Jnl. of Chemical Physics 73, n6 p2996-3000, 15 Sep 80.

The complete determination of the crystal structure of solid nitromethane has been obtained from single crystal x-ray diffraction and neutron powder diffraction data.

PB81-145500 Not available NTIS
National Bureau of Standards, Washington, DC.
A Study of Methyl Reorientation in Solid Nitromethane by Neutron Scattering,
S. F. Trevino, and W. H. Rymes. Sep 80, 16p
Pub. in Jnl. of Chemical Physics 73, n6 p3001-3006, 15 Sep 80.

The geometrical and dynamical properties of the reorientation of the methyl group of nitromethane in the solid state have been studied by inelastic neutron scattering.

PB81-145534 Not available NTIS
National Bureau of Standards, Washington, DC.
Kinetic Perturbation Theory for Dilute Gases,
John M. Kincaid, and Richard F. Kayser, Jr. Aug 80, 2p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Physical Letter 78A, n3 p215-216 Aug 80.

The authors proved for two classes of smooth, repulsive interparticle potentials phi(r) = phi sub 0 (r) + lambda phi sub 1 (r), that the collision integrals of the linearized Boltzmann equation are analytic functions of lambda in the neighborhood of lambda = 0. It then follows, for example, that the first Enskog approximation for the transport coefficients can be represented by a Taylor series in lambda.

PB81-145575 Not available NTIS
National Bureau of Standards, Washington, DC.
Stokes-Einstein Diffusion of Critical Fluctuations in a Fluid,
H. C. Burstyn, J. V. Sengers, and P. Esfandiari. Jul 80, 3p
Grant NSF-DMR79-10819
Pub. in Physical Review A 22, n1 p282-284 Jul 80.

The theory of dynamic critical phenomena predicts that the diffusion coefficient associated with the order-parameter fluctuations near the critical point of fluids should vanish asymptotically as D=RKT/6pi eta sigma, where eta is the shear viscosity, sigma the correlation length and R a universal constant.

PB81-145583 Not available NTIS
National Bureau of Standards, Washington, DC.
The Role of Steps and Defects in Electron Stimulated Desorption Oxygen on Stepped W (110) Surfaces,
Theodore E. Madey. 1980, 24p
Sponsored in part by Office of Naval Research, Washington, DC.
Pub. in Surface Science 94, p483-506 1980.

In order to examine the role of atomic steps and defects on electron stimulated desorption (ESD) phenomena, the author has studied the adsorption of oxygen on a polyhedral tungsten crystal containing a W(100) flat and 4 flats having orientations 6 and 10 degrees off the (110) plane with rows of steps parallel to the (100) and (110) directions. Adsorption at low coordination sites appears to be a key factor in producing high ESD ion yields.

PB81-149254 Not available NTIS
National Bureau of Standards, Washington, DC.
Characterization of the Emission from Atomic Hydrogen in a Microwave Induced Plasma,
Frederick P. Schwarz. Aug 79, 5p
Pub. in Analytical Chemistry 51, p1508-1512 Aug 79.

Microwave induced plasma detectors (MPD) are typically operated with small amounts of oxygen added to the helium or argon plasma gas in order to keep the plasma cell walls clean. It is shown, however, that the presence of oxygen in the plasma gas causes a nonlinear response in the hydrogen emission dependence on concentration, as well as the appearance of hydrogen emission upon passage of deuterium through the MPD. Both effects diminish with increasing plasma pressure and disappear in the absence of oxygen. A kinetic scheme, based on radiative charge recombination between protons and electrons and generation of the protons and electrons via the metastable He 2s triplet S state, is presented to account for these effects. It is suggested that oxygen affects the hydrogen emission through a charge transfer reaction between protons and molecular oxygen.

PB81-149262 Not available NTIS
National Bureau of Standards, Washington, DC.
Liquidons and Gasons: Controversies About the Continuity of States,
J. M. H. Levelt Sengers. 1979, 40p
Grant NATO-1065
Pub. in Physica 98A, p363-402 1979.

Two basic ideas about the nature of the gas-liquid transition were voiced around 1870: that in the supercritical state vapor and liquid are indistinguishable (Andrews), and that condensation and critical behavior can be understood on the basis of a simple assumption about molecular interaction (Van der Waals). This paper describes the controversies that raged between proponents and opponents of the Andrews-Van der Waals view between 1880 and 1907, and how they were fanned by erroneous or incorrectly interpreted experiments carried out all over Europe. Kamerlingh Onnes and his staff in Leiden repeated a number of the controversial experiments in the period 1892-1907 and discovered that impurity was by far the largest source of error. By 1907 the controversy was rather unequivocally decided by the Leiden group in favor of the Andrews-Van der Waals view. A replay of the old controversy took place in the period 1933-1952.

PB81-149270 Not available NTIS
National Bureau of Standards, Washington, DC.
Fingerprinting and Partial Quantification of Complex Hydrocarbon Mixtures by Chemical Ionization Mass Spectrometry,
L. W. Sieck. Jan 79, 5p
Pub. in Analytical Chemistry 51, n1 p128-132 Jan 79.

A modification of chemical ionization mass spectrometry, which involves photoionization and cyclohexane as the source of the reagent ion, has been used to develop a technique for discriminatory 'finger-printing' of neat fossil fuels. The method provides a two minute turn-around time between samples and batch introduction, with no requirements for prior separation or fractionation. Depending upon the conditions chosen, the technique may also be extended to the quantification of aromatic and olefinic sample components.

PB81-149304 Not available NTIS
National Bureau of Standards, Washington, DC.
Fluorometric Determination of Partition Coefficients of Naphthalene Homologues in Octanol-Water Mixtures,
T. Krishnamurthy, and S. P. Wasik. 1978, 8p
Pub. in Jnl. Environmental Science and Health A13, n8 p595-602 1978.

The octanol/water partition coefficients of 12 naphthalene homologues have been measured using a newly developed fluorometric technique. The log P values of alkyl substituents obtained by this method were found to be in reasonable agreement with the literature values.

PB81-149312 Not available NTIS
National Bureau of Standards, Washington, DC.
On a Parametrization for Solids Under Hydrostatic Pressures,
Ronald G. Munro. Jun 78, 3p
Pub. in Physics Letters 66A, n5 p392-394, 12 Jun 78.

A newly developed parametrization successfully used to calculate the hydrostatic pressure dependence of the Cr3+ spectra of ruby is shown to be useful also for describing some cases of hydrostatic pressure shifts of Van Vleck susceptibilities and Knight shifts.

PB81-149320 Not available NTIS
National Bureau of Standards, Washington, DC.
Progress in the Development of the Peak-to-Background Method for the Quantitative Analysis of Single Particles with the Electron Probe,
J. A. Small, K. F. J. Heinrich, D. E. Newbury, and R. L. Myklebust. Apr 79, 10p
Pub. in Scanning Electron Microscopy II, p807-816 1979.

A method is described for the quantitative analysis of particles with electron excitation. For this method, the ratios of the characteristic x-ray intensities to the continuous x-ray intensities of the same energy are used to eliminate major particle effects. In order to use the analytical procedure it is necessary to calculate a value of the continuous x-ray intensity for a hypothetical bulk material with the same composition as the unknown. To date, two methods have been used to calculate this value. The first method uses Kramer's law with Green's corrections. The second method uses an empirical equation derived at NBS to calculate the continuous x-ray intensity of the bulk. Results from the analysis of both glass and mineral particles with the particle program are in good agreement with the actural concentrations. Work is also being done with a Monte Carlo program in an effort to identify those conditions under which the correspondence of the peak-to-background ratio between particles and bulk material of the same composition breaks down.

PB81-149346 Not available NTIS
National Bureau of Standards, Washington, DC.
Correlation of Thermodynamic Properties of Aqueous Polyvalent Electrolytes,
Bert R. Staples. 1979, 8p
Pub. in Proceedings of International Conference on the Properties of Steam (9th), Technische Universitat, Munchen, Germany, September 10-14, 1979, Paper in Water and Steam, Their Properties and Current Industrial Applications, p608-615 1979.

The techniques used in the critical evaluation and correlation of thermodynamic properties of aqueous polyvalent electrolytes will be described. The Electrolyte Data Center at the U.S. National Bureau of Standards is engaged in the correlation of activity and osmotic coefficients, enthalpies of dilution and solution, heat capacities, and ionic equilibrium constants for aqueous salt solutions. Current results for about 100 correlations will be compared and observed periodic trends and trends according to charge-type will be discussed.

PB81-149353 Not available NTIS
National Bureau of Standards, Washington, DC.
Laser Enhanced Ionization for Trace Metal Analysis in Flames,
J. C. Travis, G. C. Turk, and R. B. Green. 1978, 11p
Pub. in Proceedings of ACS, Division of Analytical Chemistry at the Meeting of the American Chemical Society (175th), Anaheim, CA., March 14-15, 1978, Paper No. 6 in New Applications of Lasers to Chemistry, ACS Symposium Series 85, p91-101 1978.

A new laser-based flame analytical method, requiring no optical detection, promises to outperform traditional methods in many applications. Detection is based on the enhanced flame ionization of analyte atoms maintained in an excited state by a laser tuned to the desired electrical probes located at the outer edges of the flame. This configuration yeilds ng/ml detection of Cr, Fe, Ga, In, K, Mg, Mn, Na, Pb, and Tl, with negligible probe deterioration over days of operation. Less impressive results for the few remaining elements studied to date are attributed to the role of the ionization potential, and more appropriate transitions are being explored.

PB81-149361 Not available NTIS
National Bureau of Standards, Washington, DC.

Laser-Enhanced Ionization in Flames: A New Flame Spectrometric Technique,
G. C. Turk, J. C. Travis, J. R. DeVoe, and T. C. O'Haver. 1978, 4p
Pub. in Analytical Chemistry 50, n6 p817-820 1978.

A new flame spectrometric technique using laser-enhanced ionization is described. The method is based on the increase in flame conductivity resulting from the enhanced thermal ionization of an element following the absorption of laser radiation at a transition wavelength for that element. Detection limits are reported for Cu, Mg, Mn, Na and Pb. In most cases the detection limits are comparable or better than the best reported values for other flame spectrometric techniques. Also discussed is the unique ability of laser-enhanced ionization to use non-resonance or weak resonance lines, often with sensitivity comparable or better than the traditional lines used in other flame spectrometric techniques.

PB81-149387 Not available NTIS
National Bureau of Standards, Washington, DC.
Determination of Transition Temperatures on Sodium Stearate Using Gas Chromatography,
Stanley P. Wasik. Nov 76, 3p
Pub. in Jnl. of Chromatographic Science 14, p516-518 Nov 76.

A gas chromatographic method is presented for detecting structural changes in a solvent by observing the solubility behavior of a 'probe' solute molecule. The transition temperatures of solid and liquid sodium stearate were determined at this point on the log V(g) - 1/T plot where the slope changes abruptly. The observed transition temperature were compared with differential scanning calorimetry measurements on the same compound and the results of other investigators using different physical methods.

PB81-149403 Not available NTIS
National Bureau of Standards, Washington, DC.
Factors Influencing Precision and Accuracy of Analysis with Inductively Coupled Plasmas,
Robert L. Watters, and John A. Norris. 1978, 17p
Pub. in Proceedings of Eastern Analytical Symposium, New York, NY., November 31-December 2, 1977, p65-81 1978.

In order to analyze Standard Reference Materials for certification, it is necessary to establish which instrumental factors contribute to the errors of the analysis technique. The first step is to attain adequate control of the random errors in the entire measurement process. Once this is achieved it becomes possible to evaluate the magnitude of the error and thereby to properly estimate accuracy. This paper describes some of the problems encountered in realizing adequate control of the random errors associated with the Inductively Coupled Plasma. The effects of some important instrumental parameters on the precision of the analytical signal will be described. Preliminary analysis data will be presented to demonstrate the possible magnitude of systematic errors which arise from instrumental sources.

PB81-149411 Not available NTIS
National Bureau of Standards, Washington, DC.
Electron-Microscope Study of Crystal Structures of Mixed Oxides in the Systems Rb(2)0-Ta(2)0(5), Rb(2)0-Nb(2)0(5) and K(2)0-Ta(2)0(5) with Composition Ratios Near 1:3. II. Various Intergrowth Phases and Two-Dimensional Ordering of Pentavalent Ions,
K. Yagi, and R. S. Roth. 1978, 9p
Pub. in Acta Crystallographica A34, p773-781 1978.

In part I, the preceding paper, structural models were proposed on the basis of high-resolution electron microscopy for phases previously designated as 11L, 9L and 16L, which were found to exist in the title systems. Two types of blocks were found, which are composed of five and six layers of octahedra. In the present paper, various intergrowth phases which are composed of the two types of blocks are described. A new notation is proposed to denote these intergrowth phases as well as the 11L, 9L and 16L structures. Two-dimensional ordering of pentavalent ions in the six-layer block is found, giving rise to diffuse scattering in electron diffraction patterns. Two-dimensional images, calculated on the basis of the proposed model, are found to reproduce the observed images.

PB81-149429 Not available NTIS
National Bureau of Standards, Washington, DC.
Infrared Spectroscopic Study of Activated Surface Processes; CO Chemisorption on Supported Rh,
J. T. Yates, Jr., T. M. Duncan, and R. W. Vaughan. Nov 79, 8p
Pub. in Jnl. Chemical Physics 71, n10 p3908-3915, 15 Nov 79.

The infrared spectrum of CO chemisorbed on alumina-supported Rh surfaces has been studied following chemisorption at cryogenic temperatures.

PB81-149452 Not available NTIS
National Bureau of Standards, Washington, DC.
NMR Study of Diffusion of Butane in Linear Polyethylene,
I. Zupancic, G. Lahajnar, R. Blinc, D. H. Reneker, and A. Peterlin. 1978, 9p
Pub. in Jnl. of Polymer Science, Polymer Physics Edition 16, p1399-1407 1978.

The diffusion coefficient of butane in linear polyethylene at room temperature as a function of the vapor pressure of butane was measured by the spin echo method with a pulsed magnetic field gradient.

PB81-149528 PC **A05/MF A01**
National Inst. for Environmental Studies, Tsukuba (Japan). Div. of Chemistry and Physics.
Multielement Analysis Studies by Flame and Inductively Coupled Plasma Spectroscopy Utilizing Computer-Controlled Instrumentation.
Research rept.,
Naoki Furuta. 1980, 97p R-12-80
Errata sheet inserted.

At present such an interelement interaction is known to play an important role in environmental and biological problems(16). Therefore, the need for multielement analysis is strikingly clear. The report describes analytical studies which are concerned with multielement analysis by atomic spectoscopic methods. The introductory chapter outlines the significance of multielement analysis, and includes classification of the analytical techniques, the excitation sources and the measurement system. Chapter 2 provides details of the developed instrument whose photograph is shown on the first page of this report. The instrument consists of an ICP source, programmable monochromator, and SIT-OMA detector. In Chapter 3, the analytical performance of the SIT-OMA detector is considered when combined with the programmable monochromator by using nitrous oxide-acetylene flame as an excitation source. The analytical performance was improved in Chapter 4 by replacing the nitrous oxide-acetylene flame with an ICP source. ICP emission spectrometry is a most promising method for multielement analysis. Although the interference is very small in comparison to other techniques, major constituents of samples can cause background shifts which result in analytical errors. The developed instrument correct for such background changes.

PB81-149783 PC **A12/MF A01**
Wisconsin Univ.-Madison.
Methods for Analysis of Organic Compounds in the Great Lakes,
Joseph J. Delfino. c1980, 272p WIS-SG-80-236, NOAA-80111405
Proceedings of an Invitational Workshop, held at Wisconsin Univ. Great Lakes Research Facility, Milwaukee, on April 1-2, 1980.

The chief objective of this invitational workshop held at the University of Wisconsin Great Lakes Research Facility in Milwaukee, Wisconsin, on April 1-2, 1980, was to determine the extent of agreement and disagreement among research scientists and analytical chemists dealing with organic compounds found in the Great Lakes. On the basis of the collective experience of workshop participants, it was hoped to determine which analytical approaches are appropriate to the analysis of water, biota, sediment and atmospheric samples for organic compounds. It was attempted to establish, where possible, a consensus among the participants regarding the most useful and applicable analytical techniques for use in the Great Lakes. This report is a summary reviewing the discussions held at the workshop and presenting certain options for those involved in Great Lakes analytical work. A number of paper either selected or supplied by workshop participants are reprinted in Appendix a as a source of additional detailed information.

PB81-149817 Not available NTIS
National Bureau of Standards, Washington, DC.
Atomic Transition Probabilities.
Final rept.,
W. L. Wiese, and G. A. Martin. 1980, 36p
Pub. in Section E in CRC Handbook of Chemistry and Physics, 61st Ed., pE349-383 1980.

A table of selected, critically evaluated transition probabilities is presented, which comprises about 4000 prominent lines of the lighter elements from hydrogen through iron. For the sake of convenience, a compact handy format is used which contains only the bare minimum of information.

PB81-149833 Not available NTIS
National Bureau of Standards, Washington, DC.
Multiangular Absorption Measurements in a Methane Diffusion Jet.
Final rept.,
R. J. Santoro, P. J. Emmerman, R. Goulard, H. G. Memerjian, and R. Shabahang. 1980, 6p
Pub. in Proceedings of the Symposium of the Meeting of the American Chemical Society (178th), Washington, DC., September 9-14, 1979, Chapter 36 in Laser Probes for Combustion Chemistry, ACS Symposium Series 134, p427-433 1980.

A multiangular absorption approach is used to measure the concentration profile of methane across a diffusion jet. The results have been used to assess the applicability of tomography to gas phase species analysis. Comparisons of the center line concentration and jet position have shown excellent agreement with the known experimental values. The effect of the number of angles for which data is obtained has also been addressed and found to agree with previous analytical studies.

PB81-856262 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Neutron Activation Analysis: Air Pollution. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 61p NERACUSGNT2354
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the use of neutron activation techniques for multi element analysis as applied to atmospheric pollutants. Topics such as analysis of aerosols, and emissions from coal-fired and oil-fired power plants are surveyed. Fallout pollution of lakes and streams due to airborne partuculates are also emphasized. (Contains 49 citations, fully indexed and including a table of contents.)

PB81-856270 PC **N01/MF N01**
New England Research Application Center, Storrs, CT.
Neutron Activation Analysis: Air Pollution. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 117p NERACEDBNT2354
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the use of neutron activation techniques for multi element analysis as applied to atmospheric pollutants. Topics such as analysis of aerosols, and emissions from coal-fired and oil-fired power plants are surveyed. Fallout pollution of lakes and streams due to airborne particulates are also emphasized. (Contains 101 citations, fully indexed and including a table of contents.)

PB81-856940 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Chromium. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80,
Dec 80, 115p NERACASMNT2409
Sponsored in part by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning all aspects of chromium and chromium alloy electroplating on a wide variety of substrates. Information on plating bath compositions, operating parameters such as current density and temperature, as well as preparation of the substrate surface are included. (Contains 193 citations, fully indexed and including a table of contents.)

PB81-857609 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermoluminiscence. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 189p NERACUSGNT2591
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography cites reports of Federally-funded research on thermoluminescence relating to such materials as quartz, inorganic salts, organic salts, crystals, ionomers, copolymers, and polymers. Studies of crystal growth and apparatus for measurement of thermoluminescence are also included. (Contains 190 citations, fully indexed and including a table of contents.)

PB81-857617 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermoluminiscence. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 186p NERACEDBNT2591
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains worldwide information on studies and applications of thermoluminescence concerning such materials as quartz, inorganic salts, organic salts, crystals, ionomers, copolymers, and polymers. Studies of crystal growth and apparatus for measurement of thermoluminescence are also included. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857625 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermoluminiscence. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 185p NERACEI NT2591
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains worldwide information on studies and applications of thermoluminescence on such materials as quartz, inorganic salts, organic salts, crystals, ionomers, copolymers, and polymers. Studies of crystal growth and apparatus for measurement of thermoluminescence are also included. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857633 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermoluminiscence. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Dec 80, 119p NERACIAANT2591
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains worldwide information on studies and applications of thermoluminescence relating to such materials as quartz, inorganic salts, organic salts, crystals, ionomers, copolymers, and polymers. Studies of crystal growth and apparatus for measurement of thermoluminescence are also included. (Contains 122 citations, fully indexed and including a table of contents.)

PB81-857682 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Brownian Motion. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 151p NERACSPNNT2780
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning theoretical and experimental studies and mathematical techniques and analyses of brownian movement and brownian particles in general and in a wide variety of specific media. Observations of brownian movement in various media are included. (Contains 168 citations, fully indexed and including a table of contents.)

RISO-M-2216 PC **A03**/MF **A01**
Risoe National Lab., Roskilde (Denmark).
Chemical Kinetics in the Gas Phase Pulse Radiolysis of Hydrogen Sulfide Systems.
O. J. Nielsen. Dec 79, 36p
U.S. Sales Only.

Formations and decays of HS and HS sub 2 radicals in the gas phase pulse radiolysis of pure H sub 2 S, H sub 2 S/Ar and H sub 2 S/H sub 2 systems have been followed directly by kinetic spectroscopy. The literature on the subject is reviewed and a complete reaction scheme is discussed. Computer simulations have been used to check the validity of the proposed mechanisms. Rate constants ksub(HS+HS) = (2.0+-0.4) x 10 exp 10 M exp -1 s exp -1 and ksub(H+H2S) = (6.0+-1.2)x 10 exp 8 M exp -1 s exp -1 have been determined. The reaction of HS radicals with S atoms is responsible for the HS sub 2 formation. Pseudo-first order rate constants for reactions of HS with 1.3 butadiene, ethylene and molecular oxygen are reported. (Atomindex citation 11:530714)

STU-78-6706 PC **A03**/MF **A01**
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden).
Catalyst Based Instrument for Measuring Nitric Oxides.
R. Larsson, L. Larsson, and B. Rebenstorf. May 80, 40p STU-76-5030, STU-77-6407
In Swedish.

The potential of using catalytic reactions for measuring chemical substances in the atmosphere has been investigated. The first part of the project concerned nitrogen oxides and the second part aromatic isocyanates. The measuring method implies conversion of the substance in question by means of a catalyst into such a sort which is easier to measure. The analysis of NO/sub x/ is performed by catalytic oxidation of NO to NO sub 2 , which is then measured with a photometer. Higher concentrations of NO can be measured by means of coloring of the adsorption column. In this case NO sub 2 is catalytically disproportioned into NO and HNO sub 3 . The method was applied to the reaction C sub 6 H sub 5 NCO + 8.75 O sub 2 = 7 CO sub 2 + 2.5 H sub 2 O + NO sub 2 . The system CO exp 2+ /SiO sub 2 , which is a coordinatively unsaturated surface compound, also was a good catalyst for this reaction. Other aromatic nitrogen compounds were oxidized in the same temperature interval which made the application impossible. The general principle, however, seems to be convincing. (ERA citation 06:005118)

7E. Radio and Radiation Chemistry

CRN-CPR-79-08 PC **A03**/MF **A01**
Strasbourg-1 Univ. (France). Centre de Recherches Nucleaires.
Inhibition and Enhancement of Positronium Formation in Aqueous Solutions from the Doppler Broadening of Annihilation Peaks.
G. Duplatre, J. C. Abbe, A. Maddock, and A. Haessler. 1979, 30p
U.S. Sales Only.

The Doppler broadened positron annihilation line shapes have been determined in aqueous solutions of various inhibiting and enhancing agents of positronium (Ps) formation: H exp + sub(aq), NO sub 3- , S exp -- , SCN exp - the halide ions. The results confirm that the inhibition is made through electron scavenging by H exp + sub(aq) and NO sub 3- , and through positron capture, to form a bound-state, by the other ions. The characteristics and yields of the various positron-containing species in the solutions are inferred from the deconvoluted experimental line shapes. On referring to the lifetime spectroscopy experimental data, it is found that the yields of positron bound-states are lower than expected, and the formation of excited states is hypothesized to account for the discrepancy. (Atomindex citation 11:530666)

JINR-R-4-12736 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Spin Effects in the Three-Body Problem with Electromagnetic Interaction. 1. Hyperfine Structure of Pp mu -Mesic Molecule Energy Levels.
D. D. Bakalov, and S. I. Vinitskii. 1979, 22p
In Russian.
U.S. Sales Only.

An approximated (up to the members of alpha exp 2 order accuracy) operator of spin interaction of the three-body system with spin 1/2 is constructed, taking into account their electromagnetic structure, as a sum of pair spin operators obtained in the quasipotential approach. A hyperfine structure of pp mu -mesic molecule energy levels has been calculated in orthostate and its gamma sub 0 - factor. Reaction rate of mu exp - -meson capture with a proton in the pp mu mesic molecule is expressed by capture rates in p mu mesic atom. All calculations are performed in the adiabatic representation of the three-body problem. (Atomindex citation 11:529341)

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A950 143/8 MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Oceanographic Atlas of the Polar Seas. Part I. Antarctic.
1957, 154p Rept no. NOO-HO-PUB-705-PT-1
See also Part 2, AD-708 701. Supersedes AD-150 166. Errata sheet inserted. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.
Availability: Microfiche copies only.

No abstract available.

PB81-133795 PC **A07**/MF **A01**
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana, 1978-1979. Volume I. Describe Living and Dead Benthic (Macro-Meio-) Communities.
Final rept.,

R. H. Parker, A. L. Crowe, and L. S. Bohme. Nov 80, 132p NOAA-TM-NMFS-SEFC-25, NOAA-80121702
See also Volume 9, PB81-133803. Prepared in cooperation with Coastal Ecosystems Management, Inc., Fort Worth, TX.

Contents:
- Editors' section--(Regions of study for brine disposal assessment-DOE/NOAA interagency agreement, Proposed Texoma brine disposal site, Proposed Capline brine disposal site, and Sampling scheme for proposed brine disposal sites);
- Principal investigators' section--Describe living and dead benthic (macro- and meio-) communities.

PB81-133803 PC **A15**/MF **A01**
National Marine Fisheries Service, Galveston, TX. Galveston Lab.
Biological/Chemical Survey of Texoma and Capline Sector Salt Dome Brine Disposal Sites Off Louisiana, 1978-1979. Volume IX. Analysis of Variance of Gulf Coast Shrimp Data.
Final rept.,
F. J. Margraf. Nov 80, 337p NOAA-TM-NMFS-SEFC-33, NOAA-80121701
See also Volume 1, PB81-133795. Prepared in cooperation with LGL Ecological Research Associates, Inc., Bryan, TX.

Contents:
- Editors' section--(Regions of study for brine disposal assessment-DOE/NOAA interagency agreement, Proposed Texoma brine disposal site, Proposed Capline brine disposal site, and Sampling scheme for proposed brine disposal sites);
- Principal investigators' section--Analysis of variance of Gulf Coast shrimp sites.

PB81-141012 PC **A04**/MF **A01**
National Marine Fisheries Service, Woods Hole, MA. Northeast Fisheries Center.
Distribution of Gammaridean Amphipoda (Crustacea) in the Middle Atlantic Bight Region.
Technical rept.,
John J. Dickinson, Roland L. Wigley, Richard D. Brodeur, and Susan Brown-Leger. Oct 80, 58p NOAA-TR-NMFS-SSRF-741, NOAA-80120309

The distribution and abundance of 101 species of marine benthic gammaridan amphipods are described for the Middle Atlantic Bight region. This report is based on 669 quantitative grab samples from 563 stations on the continental shelf and upper continental slope between Cape Cod, MA., and Cape Hatteras, NC.

PB81-144636 PC **A02**
National Marine Fisheries Service, Narragansett, RI. Narragansett Lab.
Marine Populations: Processes and Interactions,
Kenneth Sherman, J. W. Deming, J. Frederick Grassle, Richard V. Lynch, and Eric Shulenberger. May 80, 9p NOAA-80110708
Pub. in Advanced Concepts in Ocean Measurements for Marine Biology, p539-544 May 80.

An overview of marine population processes and interactions is presented. Significant problems exist in understanding the growth and mortality processes that occur within populations, among populations, and between populations and the environment. The effects of population density on predator-prey interaction and of physical and chemical factors on age-specific rates of birth, growth, and mortality are largely unknown. Studies of the interrelationships among ecosystem components can best be approached by posing key questions dealing with the basic processes of recruitment, growth, and mortality of marine populations. To predict the responses of ocean ecosystems to manmade and natural perturbations, the authors ask how do the individual life-cycles of populations and interrelationships among species relate to patterns of environmental variation. Time-series measurement of changes in the abundance levels of fish stocks and their prey over space and time should be expanded to include all of the area now under the jurisdiction of the U.S. as described in the Fisheries Conservation and Management Act of 1977.

PB81-147225 PC **A02**
California Univ., Berkeley.
Degranulation of the Stannius Corpuscles of Coho Salmon (Oncorhynchus kisutch) in Response to Ionic Changes in Vitro,
Katsumi Aida, Richard S. Nishioka, and Howard A. Bern. c1980, 11p NOAA-80110712
Grant NOAA-04-8-M01-189
Pub. in General and Comparative Endocrinology, v41 p305-313 1980.

Stannius corpuscles of the coho salmon, Oncorhynchus kisutch, were maintained in organ culture in defined media containing various concentrations of calcium. Standard ($Ca2+$) (1.5 mM) or lower levels do not induce degranulation. Degranulation and concomitant increase in rough-surfaced endoplasmic reticulum and Golgi systems were seen after high ($Ca2+$) (3 and 6 mM) in both cell types beginning as early as 2 hr after the start of incubation. Degranulation occurred as a result of exocytosis. Ethylene-diamine tetraacetic acid blocked the effect of high ($Ca2+$). ($Mg2+$) had no effect whereas ($Sr2+$) had some effect if some $Ca2+$ was present. The calcium ionophore, A23187, at concentrations above 0.00001 M in the presence of standard ($Ca2+$), induced exocytosis in both cell types. Low ($Na+$) (50 and 100 mM) with $Ca2+$ present caused moderate to high degranulation and high ($Na+$) (225 mM) caused moderate degranulation with a ($Ca2+$) (3 mM) that typically caused high degranulation. These results indicate that the secretory activity of the cells of the Stannius corpuscles may be directly affected by plasma ion levels, especially $Ca2+$.

PB81-147233 PC **A02**
California Univ., Berkeley.
Changes in the Corpuscles of Stannius of Coho Salmon (Oncorhynchus kisutch) during Smoltification and Seawater Adaptation,
Katsumi Aida, Richard S. Nishioka, and Howard A. Bern. c1980, 11p NOAA-80110711
Grant NOAA-04-7-158-44121
Pub. in General and Comparative Endocrinology, v41 p296-304 1980.

Two types of cells (type 1 with large granules and type 2 with small granules) are present in the corpuscles of Stannius of the coho salmon, Oncorhynchus kisutch, during smoltification. The cells increase in size during normal smoltification and are equally large in freshwater and seawater smolts; in abnormal stunted fish in seawater the mean cell size is similar to that characteristic of parr. Nevertheless, the predominant type 1 cells (as well as the less frequent type 2 cells) in stunts appear active and are relatively depleted of granules. Type 1 cells may be associated with hypocalcin secretion; release of this hormone may be greater in stunts than in normal seawater smolts, possibly owing to initial difficulty of these incompletely smoltified fish to adjust to the seawater environment.

PB81-149791 PC **A03**/MF **A01**
Wisconsin Univ.-Madison.
Fish Spawning Grounds in Wisconsin Waters of the Great Lakes,
Catherine E. Coberly, and Ross M. Horrall. c1980, 46p WIS-SG-80-235, NOAA-80100810

Some of the recent efforts to restore the Great Lakes to a state resembling their original condition have focused on reestablishing or rehabilitating native fish populations. For the best chance of success, these efforts require detailed knowledge of the life history of each species, including the location of both present and past spawning grounds. This report summarizes the results of a study designed to locate as many of the spawning grounds in Wisconsin waters of the Great Lakes as possible through interviews with Wisconsin's commercial fishermen.

8C. Dynamic Oceanography

AD-A094 101/3 PC **A02**/MF **A01**
Washington Univ., Seattle. Dept. of Atmospheric Sciences.
Conference on Ocean-Atmosphere Interaction AMS (3rd) Held at Los Angeles, California on 30 January-1 February 1980.
Technical rept.,
Kristina B. Katsaros, and Paul F. Twitchell. 1980, 7p
Contract N00014-80-C-0252, Grant N00014-80-G-0024
Pub. in Bulletin of the American Meteorological Society, v61 n11 p1423-1428 Nov 80.

No abstract available.

AD-A094 240/9 PC **A05**/MF **A01**
Institute for Defense Analyses, Arlington, VA. Science and Technology Div.
A Numerical Technique for the Calculation of Dispersion Relations and Mode Functions for Upper Ocean Internal Waves.
Final rept.,
Irvin W. Kay, Patricia J. Draper, and Wasyl Wasylkiwskyj. Oct 80, 79p IDA-P-1491, IDA/HQ-80-22393, AD-E500 235
Contract MDA903-79-C-0202

This paper is concerned with calculating the internal wave eigenfunctions and dispersion relations for an infinitely deep ocean with an arbitrary Vaisala frequency profile. The method involves numerically integrating the differential equation from a depth where the profile is essentially an exponential function, and therefore where the eigenfunctions are known explicitly, to the surface where each eigenfunction must vanish. The equation that is implied by the surface boundary condition determines the dispersion relation, which is obtained numerically by solving the equation by means of the method of regula falsi. A computer program that performs the necessary calculations is described and listed.

AD-A094 345/6 PC **A02**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
A Simplified Method for Plotting Wave Refraction.
Technical rept.,
John F. Michel. Dec 73, 22p

A simplified method for plotting the refraction of waves as they traverse water of varying depths is presented. Traditional methods base the refraction diagram on a series of bathymetric contours spaced at equal intervals. This necessitates a relatively large number of computations of wave celerity and complicated plotting methods. The simplified method uses a variable contour interval so that the ratio between the celerity of the wave on the shallower side of the contour and that on the deeper side is a constant. Dimensionless values for the depth of the contours related to the wave period are computed for the celerity ratio desired. The method gives better resolution with fewer steps in plotting than the traditional method. Templates for plotting the refraction according to Snell's Law are greatly simplified because of the constant ratio of the celerities. Tables and a refraction template are provided as well as a general discussion of wave refraction. (Author)

AD-A094 346/4 PC **A03**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
Investigation of Hydrodynamic Effects of the Proposed Marina for Miami Beach, Florida,
John F. Michel. Dec 73, 35p Rept no. UM-RSMAS-73076

Under Professional Services Agreement dated 16 August 1972, the City of Miami Beach employed the firm of Greenleaf/Telesca, Planners, Engineers, Architects Inc. to prepare a feasibility study and master plan for a marine complex to be located on the east shore of Meloy Channel south of the MacArthur Causeway. Personnel of the Rosenstiel School of Marine and Atmospheric Sciences of the University of Miami under the direction of this author participated in the study and prepared a portion of the report. As a result of the preliminary work it became evident that the configuration of the marina as proposed might change the hydraulic characteristics of Meloy Channel sufficiently to cause major changes in the exchange between north Biscayne Bay and the Atlantic Ocean via Government Cut. (Author)

Group 8C—Dynamic Oceanography

AD-A094 347/2 PC **A02**/MF **A01**
Rosenstiel School of Marine and Atmospheric Science, Miami, FL.
A Study of the Feasibility of Increasing Circulation in the Waterways of the Collier Bay Area, Marco Island, Florida,
John F. Michel. Jun 73, 21p Rept no. UM-RSMAS-73044

This study was designed to determine the feasibility of improving the circulation of the Landmark and Castaways Waterway systems at Marco Island. In view of the fact that many of the waterways had already been built, only minor changes in configuration could be considered. (Author)

AD-A094 433/0 PC **A12**/MF **A01**
Woods Hole Oceanographic Institution, MA.
1980 Summer Study Program in Geophysical Fluid Dynamics - Coherent Features in Geophysical Flows.
Technical rept.,
George Veronis, and Florence K. Mellor. Nov 80, 264p Rept no. WHOI-80-53
Contract N00014-79-C-0671

Four principal lecturers shared the task of presenting the subject 'Coherent Features in Geophysical Flows' to the participants of the twenty-second geophysical fluid dynamics summer program. Glenn Flierl introduced the topic and the Kortwegde Vries equation via a model of finite amplitude motions on the beta plane. He extended the analysis to more complex flows in the ocean and the atmosphere and in the process treated motions of very large amplitude. Larry Rdekopp's three lectures summarized an extensive body of the mathematical literature on coherent features. Andrew Ingersoll focussed on the many facinating features in Jupiter's atmosphere. Joseph Keller supplemented an interesting summary of laboratory observations with suggestive models for treating the flows.

AD-A094 551/9 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
The One-Dimensionality of the Upper Ocean Mixing and the Role of Advection during the POLE Experiment.
Master's thesis,
Ricky Eugene Shook. Sep 80, 73p

A one-dimensional mixed layer model (Garwood, 1976, 1977) is used to simulate the mixed layer depth and temperature observed during POLEX, a component of the North Pacific Experiment. POLEX occurred during January-February 1974 with mid-ocean observations (35 deg n, 155 deg w) of temperature and salinity made from R/P FLIP, while FLIP was under free-drift conditions. The results of this simulation show that apparent horizontal advection, due to the drift of R/P FLIP, was important in the heat and salinity budgets, but that vertical mixing and mixed layer depth changes were controlled primarily by the one-dimensional response of the turbulent kinetic energy budget to the local atmospheric forcing. Occasionally, surface salinity flux, due to large precipitation rates, can significantly alter (on the order of tens of meters) the thickness of ocean surface turbulent boundary layer, with demonstrated decrease in thickness during a single period of strong precipitation. (Author)

AD-A950 144/6 PC **A10**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Circulation Patterns Johnston Island Winter-Summer 1965.
Special publication,
Ronald P. Kopenski, and M. P. Wennekens. Oct 66, 213p Rept no. NOO-SP-93

No abstract available.

AD-A950 148/7 PC **A04**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Atlas of Sea and Swell Charts, South Atlantic Ocean.
1948, 66p Rept no. NOO-HO-PUB-799B

This atlas contains monthly charts compiled from observations made by cooperating observers of the Hydrographic Office to and including the year 1942 (majority made between 1932 and 1940). The Hydrographic Office has included all information from its files. (Author)

AD-A950 149/5 PC **A05**/MF **A01**
Naval Oceanographic Office, NSTL Station, MS.
Atlas of Sea and Swell Charts, Northeastern Pacific Ocean.
1944, 78p Rept no. NOO-PUB-799D

This atlas contains monthly charts compiled from observations made by cooperating observers of the Hydrographic Office to and including the year 1942 (majority made between 1932 and 1940). The Hydrographic Office has included all information from its files. (Author)

PB81-137416 PC **A06**/MF **A01**
Alabama Univ., University. Bureau of Engineering Research.
Hydrodynamics of Mobile Bay and Mississippi Sound.
Interim rept.,
Donald C. Raney, Gary C. April, Lih Chern, John Phillip Jarrell, and Yieng-Chiang Wu. Mar 80, 108p BER-247-112, NOAA-80120306
Prepared in cooperation with Mississippi-Alabama Sea Grant Consortium, Ocean Springs, MS., Rept. no. MASGP-79-020.

Previous work at The University of Alabama dealing with the numerical modeling of Mobile Bay has demonstrated the value of a predictive capability describing water movement and elevation in coastal waters. Each of these water bodies influences the circulation within the other. During 1979, successful adaptation of the WIFM II models to Mississippi Sound and Mobile Bay has been achieved. Preliminary investigations have been initiated into water-quality models, storm-surge models, three-dimensional models and sediment-transport processes.

8E. Geodesy

AD-A094 573/3 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Determination of Land Elevation Changes Using Tidal Data.
Master's thesis,
Francisco A. T. V. Abreu. Sep 80, 124p

The purpose of this thesis is to study the temporal pattern of vertical land movements at selected Pacific Coast tide stations. The relative motion of the land at these stations is indicated by the relationship between monthly mean sea levels measured at pairs of stations. Examination of historical monthly mean sea level data by means of graphical and spectral analysis led to the use of an anomaly filter which adjusts for mean monthly differences. A cumulative analysis procedure of Wyss (1977) was adopted to the study of the relative movement of seven tide stations. Determination of the type of vertical movement between pairs of stations, the date of sudden movement, and the station responsible can be determined from analysis of the cumulative curve of monthly sea level difference. Results of the cumulative analysis show that tide stations, whether separated by short or long distances, experience frequent changes in relative elevation. Whether these are caused by land movements or changes in station datum, or both, is not known. (Author)

PB81-854705 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Surveying Instruments. January, 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 127p NERACEI NT2397
Sponsored by National Technical Information Service, Springfield, VA.

Worldwide information covers the different procedures and equipment for area surveying and mapping. Applications of various surveying instruments are included. (Contains 142 citations, fully indexed and including a table of contents.)

8G. Geology and Mineralogy

AD-A094 220/1 PC **A06**/MF **A01**
Terra Tek, Inc., Salt Lake City, UT.
Material Properties of Nevada Test Site Tuff and Grout.
Final rept. 1 Sep 78-31 Aug 79,
S. W. Butters, J. M. Gronseth, and J. F. Patterson. 1 May 80, 110p TR-80-35, DNA-5379F
Contract DNA001-78-C-0395

The mechanical and physical properties of tuffs and grouts from the Nevada Test Site were determined. The tests performed include unconfined compression, triaxial compression, and uniaxial strain tests. More specialized tests such as cycled burst tests to study the phenomena of residual stress buildup and triaxial creep tests to study the viscoelastic properties of tuffs and grouts were performed. The relationships between fracturing and ultrasonic velocities were also investigated. (Author)

AD-A094 301/9 PC **A08**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Earth and Planetary Sciences.
Complex Dielectric Properties of Several Igneous and Metamorphic Rocks.
Technical rept. 1 Jul 75-30 Sep 80,
Gene Simmons, Lou Caruso, and Frank Miller. 1 Oct 80, 171p
Contract N00014-76-C-0478

The complex dielectric properties of rocks are interesting scientifically and important practically. The scientific interest derives from a desire to understand the properties of materials, the electrical structure of the earth's crust, and the (electrical) loss mechanisms in the crust. The practical significance stems from potential applications in borehole logging, geothermal prospecting, mineral prospecting, and in lithospheric radiowave communications. The real part of the permittivity (epsilon') of a rock is an average of the permittivity of the individual minerals; the volume fraction of each mineral appears to be a suitable weighting function for most purposes. The loss factor (epsilon'') obviously depends on the various loss mechanisms present and on the frequency. In rocks, the value and behavior with temperature and frequency are dominated by the water (and dissolved ions) present in microcracks. In this study, we have removed the water from the microcracks in order to obtain data suitable for use in inferring the properties of rocks at depths where the microcracks are not present. Such depths may be as shallow as 1 km.

AD-A094 326/6 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Use of High-Frequency (3.5-12kHz) Echograms in the Study of Near-Bottom Sedimentation Processes in the Deep-Sea: A Review.
Journal article,
John E. Damuth. 25 Apr 80, 23p Rept no. LDGO-3009
Contract N00014-75-C-0210, Grant NSF-IDO72-06426
Pub. in Marine Geology, v38 p51-75 1980.

No abstract available.

AD-A094 334/0 PC **A03**/MF **A01**
Massachusetts Inst. of Tech,, Cambridge. Dept. of Earth and Planetary Sciences.
The Electrical Conductivity of the Crust of the Eastern United States.
Technical rept. 1 Jul 75-30 Sep 80,
Gene Simmons, Lou Caruso, and Frank Miller. 14 Nov 80, 27p
Contract N00014-76-C-0478

The electrical properties of the crust can be measured directly in the field or estimated for in situ conditions from suitable measurements made in the laboratory. Unfortunately, removal of rocks from their in situ location often changes significantly the characteristics of the rock that control the electrical conductivity; modelling those characteristics has been uncertain in the past. Thus, the problems that are inherent in the use of data measured in the laboratory to infer electrical properties of rocks in situ in the earth's crust are (1) preventing sample

bias, (2) duplicating the condition of rock in situ and at depth (including pressure, temperature, and several other variables), and (3) modelling the properties of the pore fluids. In this paper, we report new data obtained in the laboratory for several representative samples from the eastern United States. We believe that we have modelled properly all characteristics of the samples that affect significantly the electrical properties. We use the data to estimate a standard electrical model for the upper crust of the eastern United States.

PB81-141087 PC **A02**
Woods Hole Oceanographic Institution, MA.
Erosion of Rock Shores at La Jolla, California,
K. O. Emery, and G. G. Kuhn. c1980, 13p WHOI-CONTRIB-4446, NOAA-80110408
Grant NOAA-04-8-M01-189
Pub. in Marine Geology, v37 p197-208 1980. Prepared in cooperation with Scripps Institution of Oceanography, La Jolla, CA.

Detailed photographs repeated in 1979 after several decades and other measurements at La Jolla, California, provide information about processes and rates of rock-shore and sea-cliff erosion. Weathering and abrasion cause direct surface retreat particularly on steep slopes, but they are very slow on near-horizontal benches. Mass movements are episodic, and their resulting talus is comminuted rapidly by surface abrasion through sand-laden waves and currents. Measured rates of the various processes of marine erosion span a wide range but constitute a reasonable hierarchy for different exposures, processes, and lithologies.

PB81-145153 PC **A06**/MF **A01**
Indian Society of Photo-Interpretation and Remote Sensing, Dehra Dun.
Seminar on Application of Aerial Photo-Interpretation and Remote Sensing Techniques for Natural Resources Survey and Environmental Analysis - Abstracts, October 8-10, 1980.
1980, 112p

Topic areas cover: Geology; Geotechnics; Geomorphology; Hydrogeology; Soil survey; Soil conservation and watershed management; Land use and agriculture; Instrumentation & methodology; Forest resources inventory.

PB81-150146 PC **A03**/MF **A01**
Bureau of Mines, Amarillo, TX. Helium Operations.
Helium Resources of the United States, 1979.
Information circular/1980,
B. J. Moore. 1980, 33p BUMINES/IC-8831
See also report dated 1979, PB80-101744.

The helium resources are reported in four categories: (1) Helium in measured natural gas reserves and in storage, (2) helium in indicated natural gas resources, (3) helium in hypothetical natural gas resources, and (4) helium in speculative natural gas resources.

PB81-856205 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Geological Surveys for Coal, Petroleum and Natural Gas. January, 1970-October, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Oct 80.
Dec 80, 105p NERACUSGNT2175
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning techniques, instruments, and equipment used in geological surveying for fossil fuels and for resources and delivery systems related to fossil fuel exploitation. Regional and site geological surveys are included along with information about specific geologic formations and geologic structures associated with fossil fuel deposits. (Contains 84 citations, fully indexed and including a table of contents.)

PB81-856213 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Geological Surveys for Coal, Petroleum and Natural Gas. January, 1976-October, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Oct 80.
Dec 80, 296p NERACEDBNT2175
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning techniques, instruments, and equipment used in geological surveying for fossil fuels and for resources and delivery systems related to fossil fuel exploitation. Regional and site geological surveys are included along with information about specific geologic formations and geologic structures associated with fossil fuel deposits. (Contains 300 citations, fully indexed and including a table of contents.)

PB81-856221 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Geological Surveys for Coal, Petroleum and Natural Gas. January, 1970-October, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Oct 80.
Dec 80, 100p NERACEI NT2175
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning techniques, instruments, and equipment used in geological surveying for fossil fuels and for resources and delivery systems related to fossil fuel exploitation. Regional and site geological surveys are included along with information about specific geologic formations and geologic structures associated with fossil fuel deposits. (Contains 95 citations, fully indexed and including a table of contents.)

8H. Hydrology and Limnology

AD-A094 247/4 PC **A06**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Hydraulics Lab.
VAHM - A Vertically Averaged Hydrodynamic Model Using Boundary-Fitted Coordinates.
Final rept.,
Billy H. Johnson. Sep 80, 114p Rept no. WES/MP/HL-80-3

A numerical model called VAHM for computing the vertically averaged hydrodynamics of a water body, including salinity effects, has been developed. The model employs the concept of boundary-fitted coordinates to allow for an accurate representation of the boundary of the region being modeled while retaining the simplicity of the finite difference method of solution. Although a general curvilinear coordinate system covers the physical domain, all computations to solve the governing fluid dynamic equations, as well as the computation of the boundary-fitted coordinate system, are performed in a transformed rectangular plane with square grid spacing. A combination implicit-explicit finite difference scheme has been employed to numerically solve the governing equations. With such a scheme, the water surface elevation is computed implicitly using the Accelerated Gauss-Seidel solution technique, whereas the velocity and salinity fields are solved in an explicit manner. The major advantage of such a scheme is that the speed of a surface gravity wave is removed from the stability criteria while many desirable features of an explicit scheme are retained. Although additional work on VAHM remains to be completed before the model can be considered fully operational, results from the three applications of river and ocean boundaries demonstrate that the basic model behaves properly. (Author)

AD-A094 303/5 PC **A03**/MF **A01**
Geological Survey, Austin, TX. Water Resources Div.
Effects of the Rate of Releases from Sam Rayburn Reservoir on the Aeration Capacity of the Angelina River, Eastern Texas.
Final rept. Jul-Aug 79,
Jack Rawson, Richard L. Goss, and Ira G. Rathbun. Jul 80, 36p Rept nos. USGS/WRD/WRI-81/003, USGS/WRI-80-58

A three-phase study was conducted during July and August 1979 to determine the effects of varying release rates through the power-outlet works at Sam Rayburn Reservoir on aeration capacity of a 14-mile reach of the Angelina River below Sam Rayburn Dam. The dominant factors that affected the aeration capacity during the study were time of travel and the dissolved-oxygen deficit of the releases. Aeration was low throughout the study but increased in response to increases in the dissolved-oxygen deficit and the duration of time that the releases were exposed to the atmosphere (time of travel). The average concentration of dissolved oxygen in flow sustained by releases of 8,800 cubic feet per second decreased from 5.0 milligrams per liter at a site near the power outlet to 4.8 milligrams per liter at a site about 14 miles downstream; the time of travel averaged about 8 hours. The average concentration of dissolved oxygen in flow sustained by releases of 2,200 cubic feet per second increased from 5.2 to 5.5 milligrams per liter; the time of travel averaged about 20 hours. (Author)

AD-A094 410/8 PC **A03**/MF **A01**
Maryland Dept. of Natural Resources, Cheltenham.
Chester River Study. Volume I,
William D. Clarke. Nov 72, 43p
Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Chester River Study was undertaken to provide the Maryland Department of Natural Resources with environmental and resource management information. Several environmental issues and resource management problems were the focus of the study. One environmental concern was a class of chemical compounds called chlorinated hydrocarbons. These compounds consist of the hard pesticides such as DDT and chlordane, and the polychlorinated biphenyls (PCB's) widely used in industrial applications.

PB81-135444 PC **A05**/MF **A01**
Hawaii Univ., Honolulu. Water Resources Research Center.
Underground Residence Times and Chemical Quality of Basal Groundwater in Pearl Harbor and Honolulu Aquifers, O'ahu, Hawai'i.
Technical rept. 1 Sep-31 Dec 79,
Theodorus H. Hufen, Paul Eyre, and William McConachie. Feb 80, 83p TR-129, W81-00982
Grant DI-14-31-0001-3811

The deterioration in chemical quality of basal water with underlying saline water is of utmost concern on Oahu, where the Pearl Harbor and Honolulu groundwater systems constitute a primary source of fresh water. This study uses isotope and chemical analyses to investigate the storage and flow of the system of six areas in southern Oahu. Potential orgins of waters were determined by using mixing models and chemical compositions of water samples from sources located within a few miles of each other. Striking differences were found among the six areas.

PB81-135451 PC **A07**/MF **A01**
Minnesota Univ., Minneapolis. Water Resources Research Center.
The Nature and Effects of County Drainage Ditches in South Central Minnesota,
Henry W. Quade, Kent W. Boyum, Duane O. Braaten, Donald Gordon, and Clay L. Pierce. Nov 80, 135p WRRC-BULL-105, W81-00975, OWRT-A-040-MINN(7)

The extent of county drainage was determined for four counties in South Central Minnesota followed by a study of the gemorphic nature of man's drainage in contrast to natural drainage. Selected drainage ditches and low order rivers were sampled for water quality and quantity in order to determine the contributions and timing of nutrient loads from each. Seventy-nine percent of the drainage ditches were found to terminate into rivers and they more than doubled the length of the surface fluvial systems. The closeness of fit of the drainage ditch systems to the low order Strahler classification scheme suggests that man has taken an immature lake-marsh environment and within 100 years created a geomorphically mature fluvial landscape.

PB81-141905 PC **A03**/MF **A01**
Water and Power Resources Service, Denver, CO. Engineering and Research Center.
Results of a Limnological Study of Lake Pocasse, South Dakota,
Richard A. Roline, and James F. LaBounty. Jun 80, 50p REC-ERC-80-4

In 1977-78, a limnological study was done on Lake Pocasse, South Dakota, to evaluate the present condition of the lake and to assist in the feasibility decision of using the lake as a regulating reservoir. The shallow depth (3 to 4 m) allows for water temperatures during the summer to reach 25C with very little stratification. The dissolved oxygen in the water is usually maintained at levels adequate for the survival of aquatic organisms during the ice-free period, but may frequently approach anaerobic conditions during winters with heavy snow and ice cover. Lake Pocasse appears to act as a trap for sediments, nutrients, and heavy metals because of limited and irregular flushing.

PB81-144545 PC **A03**/MF **A01**
Geological Survey, Tallahassee, FL. Water Resources Div.
Nutrient Yield of the Apalachicola River Flood Plain, Florida: River-Quality Assessment Plan.
Water-resources investigations (Interim),
Harold C. Mattraw, Jr., and John F. Elder. Jun 80, 28p USGS/WRD/WRI-81/001, USGS/WRI-80-51

The Apalachicola River in northwestern Florida is the location of one of four current U.S. Geological Survey National River Quality Assessments. The investigation of the Apalachicola River and flood plain is designed to quantify the organic detritus and nutrient yield to the productive, estuarine Apalachicola Bay. The extensive riverine flood plain is subject to seasonal flooding which transports large quantities of accumulated, decaying leaf litter from the flood plain into the river and ultimately into Apalachicola Bay.

PB81-144818 PC **A16**/MF **A01**
Geological Survey, Anchorage, AK. Water Resources Div.
Water Resources Data for Alaska, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79. Nov 80, 375p USGS/WRD/HD-80/002, USGS-WDR-AK-79-1
See also report dated Nov 79, PB80-143910. Prepared in cooperation with the State of Alaska.

Water resources data for the 1979 water year for Alaska consists of records of stage, discharge, and water quality of streams; stage and water quality of lakes; and water levels and water quality in wells and springs. This report contains discharge records for 111 gaging stations; stage only records for 2 gaging stations; water quality for 58 stations; and water levels for 30 observation wells. Also included are 62 low-flow, 89 crest-stage, and 24 water-quality partial-record stations.

PB81-144842 PC **A99**/MF **A01**
Geological Survey, Little Rock, AR. Water Resources Div.
Water Resources Data for Arkansas, Water Year 1979.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79. Oct 80, 647p USGS/WRD/HD-80/009, USGS-WDR-AR-79-1
See also report dated Aug 78, PB-287 938.

Water resources data for the 1979 water year for Arkansas consist of records of stage, discharge, and water quality of streams and wells; stage, contents, and water quality of lakes and reservoirs. This report contains discharge records for 66 gaging stations; stage only records for one gaging station; stage and contents for four lakes and reservoirs; water quality for 151 stations, 51 partial-record flow stations, seven lakes, and five wells; and water levels for 83 observation wells. Also included are 125 crest-stage partial-record stations. Additional water data were collected at various sites, not part of the systematic data collection program, and are published as miscellaneous measurements. These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Arkansas.

PB81-145047 PC **A04**/MF **A01**
Arkansas Water Resources Research Center, Fayetteville.
Effects of Changes in Surface Water Regime and/or Land Use on the Vertical Distribution of Water Available for Wetland Vegetation. Part I. Dynamic Model of the Zone of Aeration.
Technical completion rept.,
Robert N. MacCallum, and R. A. Sims. Jun 80, 71p PUB-70, W81-00968, OWRT-A-023-ARK(3)

The primary objective of this study was to develop a dynamic mathematical model of the zone of aeration for wetlands which describes the vertical distribution of water available for use by vegetation. A mathematical model for simulating one-dimensional vertical groundwater movement in unsaturated soils of the Kansas prairie region, was adapted for use in a wetlands environment, typified by the Eastern Arkansas wetlands forest. The adapted model consisted of two second-order non-linear partial differential equations, and an algorithm for their numerical solution. The original model was extended to include functions for seasonal changes in transpiration and for drainage of excess precipitation. The model provides a potentially versatile management tool to assist prediction of the environmental impact of proposed flood control projects.

PB81-145682 PC **A13**/MF **A01**
Geological Survey, Harrisburg, PA. Water Resources Div.
Water Resources Data for Pennsylvania, Water Year 1979. Volume 1. Delaware River Basin.
Water-data rept. (Annual) 1 Oct 78-30 Sep 79. Sep 80, 297p USGS/WDR/HD-80/071, USGS-WDR-PA-79-1
See also Volume 2 for 1979, PB80-198864. Prepared in cooperation with Pennsylvania Dept. of Environmental Resources, Harrisburg.

Water resources data for the 1979 water year for Pennsylvania consist of records of discharge and water quality of streams; contents of lakes and reservoirs; and water levels of ground-water wells. This volume contains records for water discharge at 73 gaging stations; contents at 11 lakes and reservoirs; water quality at 39 gaging stations; and water levels at 16 observation wells. Also included are data for 43 crest-stage, 28 low-flow, and 43 water-quality partial-record stations.

PB81-149510 PC **A06**/MF **A01**
Istituto de Ricerca sulle Acque, Rome (Italy).
Un Esperimento Metodologico di Pianificazione e Gestione delle Risorse Idriche in un Grande Bacino Idrografico: un Modello per lo Studio Dell'Ossidazione Biochimica Nelle Acque di un Fiume (A Methodology Experiment in Planning and Managing Water Resources in a Large Hydrographic Basin: A Model for the Biochemical Oxidation in River Waters).
1980, 103p 40
Text in Italian. Abstract in English. Also pub. as ISSN-0390-6329.

Within the framework of environmental protection problems, water quality studies are of particular interest. In connection with a methodology experiment in planning and managing the water resources in a large hydrographic basin, a mathematical model simulating the water quality in the final stretches of the Tiber River basin has been developed. This model takes a close look at the two main analytical parameters, BOD (Biochemical Oxygen Demand) and DO (Dissolved Oxygen). On the basis of physical and biochemical aspects, related to the self-purification properties of water, the ties between the two parameters have been determined through the involved stretches. The reality and the correspondent discretization of the mathematics has been sketched in 22 elementary parts. The necessary data are organized into 'response matrixes' which enable the BOD and DO concentrations to be worked out for every elementary part once the amount of discharged BO is known.

PB81-149635 PC **A07**/MF **A01**
Missouri Water Resources Research Center, Columbia.
Stream-Watershed Relations in the Missouri Ozark Plateau Province.
Completion rept. Oct 78-Sep 80,
John R. Jones, and Miles M. Smart. Nov 80, 140p W81-00978, OWRT-A-111-MO(2)
Contracts DI-14-34-0001-9027, DI-14-34-0001-0127

Land use is the most influential watershed characteristic determining chemical concentrations of 23 streams that drained watersheds with different land uses, geologic bedrock, and soil associations in the Missouri Ozark Plateau Province. Streams draining watershed with urban land use had the highest chemical concentrations and streams draining forest watershed the lowest. Streams draining pasture watersheds were intermediate, more closely resembling streams in overall salinity, and urbans streams in nitrogen and phosphorus. Nutrient concentrations increase along a continuum in response to the area or urban or pasture area on the watershed and decrease with increasing forest area.

8I. Mining Engineering

GJBX-232(80) PC **A12**/MF **A01**
Los Alamos Scientific Lab., NM.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Vernal NTMS Quadrangle, Utah/Colorado, Including Concentrations of Forty-Two Additional Elements.
J. D. Purson. Aug 80, 254p LA-7670-MS
Contract AC13-76GJ01664

The Los Alamos Scientific Laboratory conducted a geochemical reconnaissance for uranium in the Vernal NTMS quadrangle, Utah/Colorado, in the summers of 1977 and 1978. Totals of 422 water and 1552 sediment samples were collected from 1652 locations. These samples were collected at an average density of one sample location per 11 km exp 2 over an 18,800 km exp 2 area. Water samples were collected from streams and springs. Only those samples containing >10 ppB uranium for waters and >8 ppM uranium for sediments are discussed; however, all field and analytical data are included in the appendixes. The uranium concentrations in waters range from below the detection limit of 0.01 ppB to 108.04 ppB, with a mean uranium concentration for all water types of 3.11 ppB. Three clusters of samples containing relatively high uranium values are defined; they are associated with the Duchesne River formation, the Mancos shale, or the Uinta Mountain group and Browns Park formations. A few of the samples having the highest uranium values are associated with host rocks favorable for significant uranium mineralization. Sediments collected in this study have uranium concentrations that range between 0.70 ppM and 56.70 ppM, with a mean of 3.46 ppM. The majority of sediment samples with relatively high uranium concentrations were collected from one area in the Sand Wash basin in the northeastern corner of the quadrangle and are associated with the Wasatch formation. None of the water clusters define areas of significant interest; however, the area having high uranium values in sediments is worthy of further study. (ERA citation 06:003500)

GJBX-234(80) PC **A12**/MF **A01**
Los Alamos Scientific Lab., NM.
Uranium Hydrogeochemical and Stream Sediment Reconnaissance of the Gillette NTMS Quadrangle, Wyoming, Including Concentrations of Forty-Two Additional Elements.
R. G. Warren, W. E. George, M. M. Minor, O. R. Simi, and C. L. Talcott. Aug 80, 254p LA-8003-MS
Contract AC13-76GJ01664

During 1976 and 1977, 752 water and 843 sediment samples were collected from 1419 locations within the 17 700-km exp 2 area of the Gillette quadrangle, Wyoming. Water samples were collected primarily from wells, and also from springs, ponds, and streams; sediment samples were collected primarily from stream channels, and also from springs and ponds. Each water sample was analyzed for uranium and each sediment sample was analyzed for 43 elements, including uranium and thorium. Uranium concentrations in water samples range from below the detection limit of

0.02 to 212.20 ppB and have a median of 1.10 ppB. The highest background uranium concentrations, as well as the highest individual uranium values, are in areas where favorable host units for uranium mineralization crop out. These units are the Wasatch and Fort Union formations in the Powder River Basin and the Inyan Kara group in the Black Hills. Uranium concentrations in sediment samples range from 0.64 to 29.83 ppM and have a median of 3.24 ppM. Background uranium concentrations are strongly controlled by the exposed geologic unit, and range from 4 to 8 ppM for the Cretaceous Colorado group to 1 to 3 ppM for the Triassic and Paleozoic units exposed in the Black Hills. Several areas where the Wasatch and Fort Union formations are exposed exhibit uranium concentrations in sediment samples that are slightly, but distinctly, above background values for these units. All of these areas are also associated with notably high uranium concentrations in water samples. Because epigenetic uranium mineralization in economically important areas can exhibit a similar geochemical signature, these areas within the Gillette quadrangle should be further examined for the possible presence of uranium mineralization. (ERA citation 06:003501)

INFCE/DEP/WG-1/7 PC **A12**/MF **A01**
INFCE Working Group 1. Secretariat.
Topical and Working Papers on Uranium Resources and Availability.
251p
U.S. Sales Only.

Basic topics relative to world-wide resources and availability of uranium resources; potential for recovery of uranium from mill tailings in Canada; uranium from seawater; depleted uranium as an energy source; world uranium requirements in perspective. (Atomindex citation 11:532309)

PB81-135014 PC **A02**/MF **A01**
Bureau of Mines, University, AL. Tuscaloosa Research Center.
A Continuous Dielectric Separator for Mineral Beneficiation.
Rept. of investigations/1980,
C. E. Jordan, G. V. Sullivan, B. E. Davis, and C. P. Weaver. 1980, 24p BUMINES-RI-8437
Prepared in cooperation with Alabama Univ., University.

The separator consists of a rotating drum electrode and a wire screen electrode positioned 3 mm apart. A high voltage applied across the electrodes that are immersed in a dielectric fluid produces a high-gradient electric field. The high-dielectric constant (K) minerals are attracted to and conveyed through the separator by the rotating drum electrode, while the low K minerals settle through the screen electrode. Several design and operating parameters, such as electrode configurations, the dielectric liquid and its dielectric constant, electrical voltage and frequencies, feed rates, and particle sizes were studied.

PB81-135048 PC **A04**/MF **A01**
Bureau of Mines, Washington, DC.
Surface Mine Truck Safety. Proceedings: Bureau of Mines Technology Transfer Seminars, Minneapolis, Minn., June 25, 1980, Birmingham, Ala., July 9, 1980, and Tucson, Ariz., July 24, 1980.
Information circular/1980.
1980, 68p BUMINES-IC-8828

These proceedings consist of an introduction and four descriptive papers. The first paper is an update on fire protection for large haulage vehicles, the second paper is concerned with improved visibility systems for large haulage vehicles, the third paper is on improved ladders for large haulage vehicles, and the fourth paper is concerned with large haulage vehicle operator training systems.

PB81-135055 PC **A05**/MF **A01**
Bureau of Mines, Washington, DC.
Surface Coal Mining Reclamation Equipment and Techniques. Proceedings: Bureau of Mines Technology Transfer Seminars, Evansville, Ind., June 3, 1980, and Denver, Colo., June 5, 1980.
Information circular/1980.
1980, 80p BUMINES-IC-8823

These proceedings consist of papers presented at two Bureau of Mines Technology Transfer Seminars in early 1980 for the purpose of disseminating recent advances in mining technology related to surface coal mining reclamation.

PB81-145831 PC **A03**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Geological Factors Related to Characteristics of Seafloor Manganese Nodule Deposits.
Open file rept. 1 Sep 78-31 Aug 79,
J. Z. Frazer, and M. B. Fisk. 30 Apr 80, 41p SIO-REF-79-19, BUMINES-OFR-142-80
Grant G0264024

The effect of geological factors such as environment of deposition, sediment type, water depth, and local topography on nodule abundance and composition are studied. Statistical analyses of data from the SIO Sediment Data Bank are presented. Nodule abundance is shown to be strongly dependent on sedimentation rates, with the most abundant deposits occurring where the sedimentation is lowest. Copper enrichment in nodules is found to be due to the concentration of this element by planktonic organisms which are limited to equatorial regions. Cobalt enrichment, generally greater in crusts than in nodules, is shown to be associated with volcanic seamounts in the mid-Pacific region. Regional variations in nickel and manganese contents, local variations in composition and abundance, and the inverse correlation between grade and abundance are discussed.

PB81-145849 PC **A04**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Manganese Nodule Deposits in the Indian Ocean.
Open file rept. 1 Sep 78-31 Aug 79,
J. Z. Frazer, and L. L. Wilson. 1 Sep 79, 70p
SIO-REF-79-18, BUMINES-OFR-141-80
Grant G0264024

Available data on nodule composition and abundance in the Indian Ocean are presented. Five areas in which nodule deposits might meet the criteria for consideration as mineral resources are discussed. Only one of these areas, in the central Indian Basin, offers possible sites for first generation seabed mining; the others are submarginal. It is extremely unlikely that minable deposits occur in the Indian Ocean outside of the areas studied.

PB81-145963 PC **A04**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Availability of Copper, Nickel, Cobalt and Manganese from Ocean Ferromanganese Nodules (ii).
Open file rept. 1 Sep 78-31 Aug 79,
M. B. Fisk, J. Z. Frazer, J. S. Elliott, and L. L. Wilson. 24 Aug 79, 63p SIO-REF-79-17, BUMINES-OFR-140(1)-80
Grant G0264024
See also report dated 10 Sep 78, PB-300 356 and report dated 31 Aug 80, PB81-145971.

Manganese nodule and crust elemental chemical data added to the Scripps Institution of Oceanography Sediment Data Bank from September 1978 through July 1979 are listed. The data include 280 samples assayed in the laboratory and 755 assays extracted from the literature. All available nodule abundance data is also listed. Characteristics and trends in the data are noted.

PB81-145971 PC **A06**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Availability of Copper, Nickel, Cobalt and Manganese from Ocean Ferromanganese Nodules (iii).
Open file rept. 1 Sep 79-31 Aug 80,
J. Z. Frazer, and M. B. Fisk. 31 Aug 80, 112p
SIO-REF-80-16, BUMINES-OFR-140(2)-80
Grant G0264024
See also report dated 24 Aug 79, PB81-145963.

Manganese nodule elemental chemical data added to the SIO Sediment Data Bank during the grant year are listed. The data include compositions of 388 samples analyzed at SIO and 845 analyses extracted from the literature. Information on analytical methods utilized for all nodule analyses stored in the data bank and their estimated precision and accuracy is presented. Data summaries for potential resource areas in the northeastern equatorial Pacific are updated to include information obtained in the past 2 years. Data summaries and maps of nodule distribution are presented for resource evaluation of additional areas in the Pacific and Atlantic Oceans.

PB81-147415 PC **A06**/MF **A01**
Bureau of Mines, Washington, DC.
Bureau of Mines Statistical Projection Methodology of U.S. Mineral Consumption by End Use: Aluminum as an Example.
Information circular/1980,
William Y. Mo, and Barry W. Klein. 1980, 118p
BUMINES-IC-8825

This Information Circular provides a detailed background documentation of how the Bureau of Mines projects U.S. mineral demand to the year 2000. These statistical projections serve as a quantitative basis for contingency forecasting of the low, high, and probable U.S. demand for nonfuel minerals by end-use categories and are published in the Bureau of Mines Mineral Commodity Profiles and Mineral Facts and Problems series. Aluminum is used as an example in this study.

PB81-148330 PC **A03**/MF **A01**
Bureau of Mines, Spokane, WA. Western Field Operation Center.
MILS: The Mineral Industry Location System of the Federal Bureau of Mines.
Information circular/1980 (Final),
Andrew W. Berg, and Fred V. Carrillo. 1980, 33p
BUMINES-IC-8815

The Bureau of Mines Mineral Industry Location System (MILS) is part of the computerized Minerals Availability System (MAS), a comprehensive data base of known mineral deposits. MILS, the location subsystem of MAS, has become widely used by the minerals industry and organizations with land-use planning and land management responsibilities. Information on more than 135,000 mineral locations and processing plants in the United States is contained in the data base. This information includes the name, location, mineral commodity, type of operation, bibliography, and cross-references for each property or prospect. Computer-drawn map overlays at various scales showing clustered MILS locations and computer printouts keyed to those overlays are available for inspection and reproduction at the Bureau's Field Operations Centers at Juneau, Alaska, Denver, Colo., Pittsburgh, Pa., and Spokane, Wash.

PB81-857443 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Firedamp. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 178p NERACEI NT1726
Sponsored by National Technical Information Service, Springfield, VA.

Worldwide information covers firedamp in coal mines. Discussions about concentration of firedamp in coal seams, prediction of methane emission, emission of firedamp in faces, controlling firedamp emission by the drainage method, and drainage of firedamps in abandoned mines are also included. (Contains 185 citations, fully indexed and including a table of contents.)

8J. Physical Oceanography

AD-A094 034/6 MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Atlas of North Pacific Ocean Monthly Mean Temperatures and Mean Salinities of the Surface Layer,
Margaret K. Robinson, and Roger A. Bauer.
1976, 757p NOO-RP-2
Contracts N00014-69-A-0200-6006, N00014-69-A-0200-6049
Prepared in cooperation with Compass Systems, Inc., San Diego, CA. Errata sheet inserted. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

Availability: Microfiche copies only.

Temperature structure in the North Pacific Ocean is presented in monthly means charts at 100-ft depths, surface to 400 ft (122 m). These charts were constructed from bathythermograph (BT) data obtained from 1942 to 1969, hydrocast data, means extracted from published charts, and unpublished tabulations of means. The charts were traced from computer-generated plots made directly from 1 deg quadrangle temperature means. Annual cycle temperature curves, at 10 deg-longitude and 5 deg-latitude intervals. Contrast the remarkable changes in seasonal cycles from the northern latitudes where the greatest change is at the surface to the equatorial current region where the annual range at the surface is very small and the subsurface range is large. The occurrences of middepth temperature maxima or minima also can be seen on these curves. Mean monthly thermocline depth charts are indicative of the mixed layer. Tight horizontal temperature gradients are associated with current, water mass boundaries or, beneath the surface, with the intersection of the depth level with the thermocline. Charts showing the temperature difference between the surface and 400 ft estimate the strength of the thermocline gradient between the top of the thermocline and 400 ft. Salinity charts are presented for the five depth levels. Charts of annual mean temperatures and temperature range are also presented for the five depth levels.

AD-A094 092/4 Not available NTIS
Rhode Island Univ., Kingston. Graduate School of Oceanography.
Partial Chemical Characterization of Estuarine Dissolved Organic Matter,
Richard A. Kerr, and James G. Quinn. 20 Aug 79, 10p
Contract N00014-76-C-0226
Availability: Pub. in Organic Geochemistry, v2 p129-138 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 304/3 PC **A05**/MF **A01**
Ocean Data Systems, Inc., Rockville, MD.
CONVRT: CREATABASE/RSVP Data File Software Interface.
Technical task rept.,
R. L. Hall, and J. H. Locklin. 29 Jul 80, 87p
Contract N00014-77-C-0165

CONVRT is a computer program which provides the capability to interface oceanographic hydrocast data contained in the SEAS Data Bank with the programs RSVP and RETVAL which are used to select and preprocess ocean station data for use by the NORDA suite of acoustic models. CONVRT is a stand-alone program which generates a packed RSVP input data file from a Subset Binary File produced by CREATABASE, the Data Bank storage and retrieval system. This data file reformatting is accomplished in an efficient and uncomplicated mannner with a minimal amount of user interaction. This document is the complete technical and user documentation for CONVRT. It presents a discussion of the software design and implementation and the source level documentation for all components of the program. It also describes the input and output files in detail as well as instructions to the user for the preparation of the input file and the execution of the program. (Author)

AD-A094 327/4 PC **A02**/MF **A01**
Scripps Institution of Oceanography, La Jolla, CA.
Atlantic Lithosphere Sounding,
C. S. Cox, J. H. Filloux, D. I. Gough, J. C. Larsen, and K. A. Pouels. 17 Feb 78, 24p
Contract N00014-75-C-0152
Pub. in Jnl. of Geomagnetism and Geoelectricity, v32 suppl I pSI13-SI32 1980.

No abstract available.

AD-A094 523/8 PC **A02**/MF **A01**
Lamont-Doherty Geological Observatory, Palisades, NY.
Acoustic Stratigraphy and Biostratigraphy of Neogene Carbonate Horizons in the North Equatorial Pacific,
Journal article,
Robert W. Embley, and David A. Johnson. 7 Jan 80, 17p Rept no. LDGO-3013
Contract N00014-75-C-0210, Grant NSF-OCE76-20154
Pub. in Jnl. of Geophysical Research, v85 nB10 p5423-5437, 10 Oct 80. Sponsored in part by Grant NSF-OCE76-18049.

No abstract available.

AD-A094 534/5 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
The Numerical Solution of Coupled Nonlinear Differential Equations Occurring in Oceanographic Thermostad Modeling.
Memorandum rept.,
Peter C. Mignerey, and Richard P. Mied. 28 Jan 81, 23p Rept no. NRL-MR-4448

A nonlinear numerical eigenvalue problem is solved to yield the shape and velocity profile of a submerged isothermal water mass assumed azimuthally symmetric and in gradient wind balance with a linearly stratified background. Solutions are found to exist and have widths approx. 30 km, heights approx. 100 m, and particle speeds at rim approx. 15 cm/sec. (Author)

AD-A094 556/8 MF **A01**
Naval Postgraduate School, Monterey, CA.
Hydrographic Applications of the Global Positioning System.
Master's thesis,
Penny D. Dunn, and John W. Rees, II. Sep 80, 229p
Availability: Microfiche copies only.

Global positioning satellites receivers have been tested under a variety of conditions and have demonstrated exceptional accuracy. The most portable of the Phase I development equipment is the manpack/vehicle user equipment (MVUE or Manpack). The purpose of this study was to determine if a manpack is suitably accurate for coastal hydrographic surveying at scales on the order of 1:20,000. The MVUE was placed aboard the Naval Postgraduate School Research Vessel (R/V) ACANIA and operated under survey conditions in Monterey Bay, California. This objective required the testing of the manpack developed by Texas Instruments, Inc. under varying survey conditions to determine the degradation of positional accuracy. The limit of the survey to which the unprocessed manpack data could be employed in a real-time operation was found to be 1:80,000 and smaller by the positioning error criteria of 0.5 mm to the scale of the survey (Umback, 1976). Application of differential techniques during the post-processing of the MVUE position data increased the limit of the survey scale to 1:40,000 using the same positioning criteria. (Author)

AD-A950 134/7 PC **A02**/MF **A01**
Geophysical Aircraft Service Co., Houston, TX.
Air-Sea Support Services.
Final rept.,
J. A. Barkley. Jul 70, 14p Rept no. N-588
Contract N00014-70-C-0061

No abstract available.

PB81-128241 PC **A02**
Louisiana State Univ., Baton Rouge. Coastal Studies Inst.
High-Precision Instrumentation System for Sea-Bed Pressure Measurements in Muddy Sediments.
Rodney G. Fredericks, and John T. Wells. c1980, 7p LSU-R-80-013, NOAA-80111706
Pub. in Oceans 80, IEEE, 6p 1980.

A high-precision system for measuring pressure variations in fine-grained sediments has been developed using quartz-oscillating pressure transducers and digital data-handling techniques. This instrument has the important feature of being capable of monitoring remotely both mean and fluctuating components of near-bottom or subbottom sediment density variations and at the same time obtaining a time history of surface water waves and tidal elevation changes.

PB81-133787 PC **A03**/MF **A01**
National Oceanic and Atmospheric Administration, Rockville, MD. Office of Marine Pollution Assessment.
Suspended Particulate Matter, Temperature and Salinity Data, New York Bight, 1979.
Data rept.,
Robert G. Mann. Oct 80, 47p NOAA-DR-OMPA-1, NOAA-80120905

Suspended particulate matter, temperature and salinity data are presented from seven monthly sampling cruises in the New York Bight. The purpose of the sampling was to examine the temporal and spatial distribution of particulates discharged from the Hudson-Raritan estuary. The data was collected using water bottles and probes at 41 stations along six transects from mid-March through early September 1979.

PB81-139586
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Marine Science in Barcelona,
W. V. Burt. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p291-293, 30 Jun 80.

No abstract available.

PB81-139594
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Physical and Chemical Oceanography in Aberdeen Plus the Riddle of the Grilse,
W. V. Burt. 30 Jun 80, 4p
Included in European Scientific Notes, v34 n6 p293-296, 30 Jun 80.

Research conducted in the Aberdeen Marine Laboratory of the Scottish Department of Agriculture and Fisheries, is discussed.

PB81-148496 PC **A07**/MF **A01**
National Oceanic and Atmospheric Administration, Seattle, WA. Pacific Marine Environmental Lab.
Physical Environment of the Eastern Bering Sea March 1979.
Technical memo.,
S. A. Salo, C. H. Pease, and R. W. Lindsay. May 80, 129p NOAA-TM-ERL-PMEL-21, CONTRIB-467, NOAA-80110705

This report includes two analyses of data collected by the NOAA Ship Surveyor in the southeastern Bering Sea during March, 1979. The first section presents CTD's and data on sea surface temperature and salinity and on surface winds and air temperature. The data indicate that ice was advected south to the ice edge by northerly winds, and that net melting occurred at the ice edge. The second section describes two cases when cold continental air moved from the ice over the water at the edge. An estimate is made of the resulting surface heat flux.

8K. Seismology

AD-A094 036/1 PC **A03**/MF **A01**
Teledyne Geotech, Alexandria, VA. Seismic Data Analysis Center.
Evidence of Spall from Deghosting of Short-Period Teleseisms.
Technical rept.,
William C. Dean, and John H. Goncz. 12 Apr 78, 48p Rept no. SDAC-TR-78-2
Contract F08606-78-C-0007, DARPA Order-2551

Spall signals, if present on teleseisms, should be most easily detected in the short-period P-waveforms. If pP and spall (P sub s) echoes are identical in waveform to the P then, theoretically, deghosting filters could remove these source echoes and produce identical seismograms from neighboring explosions with nearly identical source-to-receiver paths. If P sub s is absent, the pP corrections alone suffice. Determining the optimum echo amplitude and delay parameters involves trial-and-error and using known event depths and close-in measurements of pP and P sub s echo delays when available. Two explosions at Pahute Mesa, KNICKERBOCKER in 1967 and CHATEAUGAY in 1968, which were within 25 meters of the same depth

and within 0.5 kilometers of the same location, generated virtually identical seismograms at all stations; their correlation coefficient exceeded 0.95 at RKON. For other neighboring pairs of Pahute Mesa explosions correlation coefficients ranged between 0.50 and 0.70.

AD-A094 471/0 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
Geophysical Signal Recognition.
Technical rept.,
C. H. Chen. 29 Jan 81, 17p Rept no. SMU-EE-TR-81-5
Contract N00014-79-C-0494

Progress of pattern recognition as applied to various geophysical signals is reviewed. They include the teleseismic signals for nuclear detection and monitoring, exploration seismic signals for oil prospecting, marine seismic signals for study of subsurface structure of ocean floor, seismic signals for earthquake prediction, seismic signals for intrusion-detection, and geomagnetic signals for study of irregularities of the earth's magnetic fields. With the exception of teleseismic signal, research in geophysical signal recognition is still in its infancy. We expect to see considerable research progress in the next decade. (Author)

AD-A094 493/4 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. Seismological Lab.
Far-Field and Near-Field Radiation from a Growing and Propagating Relaxation Source,
Terrance G. Barker, and J. B. Minster. 30 Nov 79, 17p CONTRIB-3353, AFOSR-TR-81-0003
Contract F49620-77-C-0022
Pub. in Wave Notion, v2 p231-245 1980. Prepared in cooperation with Systems, Science and Software, La Jolla, CA.

No abstract available.

AD-A094 494/2 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. Seismological Lab.
Teleseismic Observations of the 1976 Friuli, Italy Earthquake Sequence,
John Cipar. 15 Nov 79, 23p CONTRIB-3320, AFOSR-TR-81-0002
Contract F49620-77-C-0022, Grant NSF-GAR78-14768
Pub. in Bulletin of the Seismological Society of America, v70 n4 p963-983 Aug 80.

No abstract available.

AD-A094 524/6 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena. Seismological Lab.
Faulting Process of the May 17, 1976 Gazli, USSR Earthquake,
Stephen Hartzell. 17 Mar 80, 25p CONTRIB-3423, AFOSR-TR-81-0001
Contract F49620-77-C-0022, Grant NSF-PFR78-08813
Pub. in Bulletin of the Seismological Society of America, v70 n5 p1715-1736 Oct 80.

No abstract available.

NUREG/CR-1805 PC **A06**/MF **A01**
National Geophysical and Solar-Terrestrial Data Center, Boulder, CO.
An Analysis of Earthquake Intensities with Respect to Attenuation, Magnitude, and Rate of Recurrence - Revised Edition.
Final rept.,
R. J. Brazee. Dec 80, 106p NOAA-TM-EDS-NGSDC-2
Contract AT(49-25)-1004

Earthquake intensity reports collected by various agencies of the U.S. Government from many thousand localities for the years 1928 through 1973 have been encoded and filed on magnetic tape. A method for determining systematically the isoseismal areas and distances is developed and used for the analysis of intensity attenuation. Suites of curves, with corresponding formulas, are developed depicting the attenuation regimes for the Eastern and Western United States and for each of several subregions. A method of calculating recurrence curves is presented, which permits the determination of such a curve by electronic computer/plotter for any point in the conterminous United States. Magnitude versus area of perceptibility relationships are developed and magnitude versus maximum intensity is defined for the various regions.

8L. Snow, Ice, and Permafrost

PB81-802209 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Snow Studies. 1975-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1975-Nov 80.
Jan 81, 289p
Supersedes PB80-801301, and NTIS/PS-78/1144. See also 1964-1974, NTIS/PS-76/0808.

The bibliography covers research on snow cover, snowmelt, snowdrifts, snow removal, trafficability, snow rescue and survival, physical and mechanical properties, as well as detection by remote sensing. Applications include construction of roads, runways, buildings, pipelines, etc., in cold, remote, arctic, or subarctic regions. (This updated bibliography contains 283 citations, 26 of which are new entries to the previous edition.)

PB81-856114 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ice Formation. January, 1970-November, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 230p NERACUSGNT1900
Sponsored by National Technical Information Service, Springfield, VA.

The citations cover studies and prediction of ice formation in lakes, rivers, and in the arctic regions. Formation of ice on aircraft and breaking or controlling of ice in various stages are also discussed. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-856122 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ice Formation. January, 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 122p NERACEI NT1900
Sponsored by National Technical Information Service, Springfield, VA.

The citations from global sources cover studies and prediction of ice formation in lakes, rivers, and in the arctic regions. Formation of ice on aircraft and breaking or controlling of ice in various stages are also discussed. (Contains 117 citations, fully indexed and including a table of contents.)

8M. Soil Mechanics

AD-A094 123/7 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Near Field Static Tilt from Surface Loads.
Environmental research papers,
James F. Lewkowicz, and Gerry H. Cabaniss. 8 Jul 80, 21p Rept nos. AFGL-TR-80-0221, AFGL-ERP-710

A field experiment was performed to determine the response of a tiltmeter to static loads produced by a vehicle. This report compares the results of a theoretical approximation of the vehicle load, by four point forces acting on a linear elastic single layer homogeneous half space, with the experimental data. Results indicate that this model gives a reasonable approximation to the field data. In order to model the field conditions more realistically, it is suggested that the finite element method be utilized in future studies. (Author)

AD-A094 605/3 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Thermal Diffusivity of Frozen Soil.
Special rept.,
F. D. Haynes, D. L. Carbee, and D. J. VanPelt. Dec 80, 33p Rept no. CRREL-SR-80-38

Knowledge of the thermal diffusivity of frozen soils is necessary for transient heat transfer analysis. The specific heat, thermal conductivity and density for a sand, a silt and a clay were obtained experimentally and used to calculate their thermal diffusivity. These properties were measured over a range of temperatures from -50 C to +45 C and for moisture contents from dry to saturated. The use of a differential scanning calorimeter for obtaining specific heat values was proven to be a reliable technique. (Author)

PB81-130064 PC **A09**/MF **A01**
California State Dept. of Transportation, Sacramento. Office of Transportation Lab.
In-Situ Measurement of Soil Properties.
Final rept.,
S. B. P. John. May 80, 181p TL-632136, FHWA/CA/TL-80/13

This report presents evaluation of five in situ testing devices. The five devices are Iowa Borehole Shear Device, Vane Shear Device, Standard Penetrometer, Dutch Cone Penetrometer and Cambridge Self Boring Pressuremeter. These devices have been field tested in three northern California sites, namely: Downtown Sacramento, Rio Vista, and Mare Island. The in situ tests were conducted in silty sand, silty clay, San Francisco bay mud (recent), peat, and peaty clay. Maximum depth tested was 50 feet. Laboratory tests were conducted on undisturbed samples. The various soil parameters derived from laboratory tests have been compared with those from the field tests. The effects of soil disturbance are discussed. A separate report appendix intended for limited distribution (upon request) contains information on modification of probes, adaptation of drill rigs, calibration, testing procedures, boring profiles, and a bibliography.

9.

ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A094 069/2 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Electrical Engineering.
Investigation of Charge Coupled Devices for Signal Processing.
Final technical rept. 15 Apr 77-1 Jun 80,
C. T. Sah, P. C. Chan, J. F. Detry, and Y. C. Sun. Dec 80, 85p SCIENTIFIC-4, TR-40, RADC-TR-80-333
Contract F19628-77-C-0138

This report describes a noise correlation processor for automatic low frequency noise power spectra measurements, theoretical analysis of hot electron effects and trapping noise in silicon charge coupled devices, small-signal equivalent circuit measurement of SiO2-Si interface states, the voltage stimulated capacitance transient spectroscopy (VSCTS or DLTS) of silicon bulk deep levels due to impurities and ion implantation damage for buried channel CCD, spurious DLTS surface signal, and CCD performance limitations by interband impact

ionization effects due to high electric field in the gap and under the gate of CCD. (Author)

AD-A094 206/0 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Scientific Experiment (Selected Articles),
Han Daxing, and Zhou Wenbin. 9 Dec 80, 31p
Rept no. FTD-ID(RS)T-1803-80
Edited trans. of Ke Xue Shi Yan (China) n6 p1-2, 27-29 1980.

No abstract available.

AD-A094 405/8 PC **A04**/MF **A01**
Celanese Research Co., Summit, NJ.
Intercalated Graphite Fiber Conductor.
Final technical rept. 26 Sep 79-15 Dec 80,
Ilmar L. Kalnin. Dec 80, 72p
Contract DAAK70-79-C-0182

Lightweight electrical conductors were developed from graphitic fibers intercalated with highly electrophilic intercalants. Conductance increases of 30-36 times over the unintercalated fibers were observed. This corresponds to about 45% of the specific conductivity of copper at room temperature. Unlike copper, the intercalated graphite fibers exhibit a nearly zero temperature coefficient of conductance. The intercalated yarn did not change its resistance during 100 hours of passage of current at 1 watt power dissipation and current densities of 25-35 A/mm squared. Four graphite 'wires,' equivalent in size to 17-20 AWG copper wire were delivered. (Author)

AD-A094 515/4 PC **A02**/MF **A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
The Role of Scattered Radiation in the Dosimetry of Small Device Structures,
J. C. Garth, E. A. Burke, and S. Woolf. 1980, 9p
Rept no. RADC/ETR-81-0003
Pub. in IEEE Transactions on Nuclear Science, vNS-27 n6 p1459-1464 Dec 80.

No abstract available.

PAT-APPL-6-200 226 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Scan Corrected Vidicon Camera Apparatus.
Patent Application,
Filed 23 Oct 80, 16p AD-D008 044/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A scan corrected vidicon camera apparatus utilizing a spatial reference filter with an array of slits that is fitted directly on the faceplate of a vidicon tube. The spatial reference filter is used in conjunction with perturbations that are injected into the vertical and horizontal sweeps. The resultant video waveform is correlated in a microprocessor unit to linearize the respective sweeps. (Author)

PATENT-4 229 812 Not available NTIS
Department of the Navy, Washington, DC.
Apparatus for Securing a Ferroelectric Stack to a Weighted Projection Surface.
Patent,
Jack W. Holloway. Filed 24 Nov 71, patented 21 Oct 80, 5p AD-D008 031/7, PAT-APPL-201 706
Supersedes PAT-APPL-201 706-71.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A coupling ring is bonded onto the opposite ends of a ferroelectric stack having substantially the same thermal expansion coefficient as the stack. A thin film of silicone compound is wiped onto the axially exposed surfaces of the rings and surfaces provided in a head and a tail mass are configured to mate with them. A plurality of microspheres are mixed uniformly through a liquid adhesive and this mixture is coated onto the suitably shaped surfaces on the head and tail mass. A stress rod reaching between the head and tail mass axially compresses the ferroelectric stack and excess adhesive mixture is squeezed from between the mating surfaces. The thickness of the liquid adhesive is restricted to the diameter of the microspheres to ensure a high impedance match and upon applying the proper amount of heat, rigid joints are set up between the now hardened adhesive and the head and tail mass. Nonrigid joints are created across the silicone compound films to create an optimum impedance match between the ferroelectric stack and the masses and to prevent the transfer of self-destructive tensile strains as the head and tail masses change dimensions in response to changing ambient temperatures. (author)

PATENT-4 242 179 Not available NTIS
Department of the Air Force, Washington, DC.
Method of Fabricating Cadmium Electrodes.
Patent,
David H. Fritts, John F. Leonard, and Thirumalai G. Palanisamy. Filed 27 Jul 79, patented 30 Dec 80, 4p AD-D008 064/8, PAT-APPL-6-061 558
Supersedes PAT-APPL-6-061 558, AD-D006 476.
Availability: This Government-owned invention is available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

The fabrication of porous cadmium electrodes is disclosed in which high cadmium loading without surface buildup is obtained by using a relatively low current density (approximately 0.2 amperes per square inch of plaque area) and period current reversals of time durations approximately equal to 15% of the forward time durations at a current density substantially equal to the forward current density. (Author)

PB81-143521 Not available NTIS
National Bureau of Standards, Washington, DC.
Piezoelectric and Pyroelectric Applications of Plastics,
M. G. Broadhurst, S. Edelman, and G. T. Davis. 1980, 5p
Pub. in Proceedings of the Division of Organic Coatings and Plastics Chemistry, American Chemical Society National Meeting (179th) Held at Houston, TX. on Mar 23-28, 1980, Paper in Organic Coatings and Plastics Chemistry 42, p241-245 1980.

Synthetic polymeric materials can have large and durable electric dipole polarization. This polarization varies linearly with small applied stresses such as electric fields, mechanical stress and temperature change, and this sensitivity renders them useful as piezoelectric and pyroelectric transducers.

PB81-857500 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Superconducting Cables. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 215p NERACUSGNT2395
Sponsored by National Technical Information Service, Springfield, VA.

The citations cover information on research, development, testing, fabrication, and applications of superconducting cables to transmit AC and DC high energy currents. Niobium-tin alloys and helium used in superconducting cables are also discussed. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857518 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Superconducting Cables. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 197p NERACEDBNT2395
Sponsored by National Technical Information Service, Springfield, VA.

The citations cover global information on research, development, testing, fabrication and applications of superconducting cables to transmit AC and DC high energy currents. Niobium-tin alloys and helium used in superconducting cables are also discussed. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857526 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Superconducting Cables. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 190p NERACEI NT2395
Sponsored by National Technical Information Service, Springfield, VA.

The citations cover global information on research, development, testing, fabrication, and applications of superconducting cables to transmit AC and DC high energy currents. Niobium-tin alloys and helium used in superconducting cables are also discussed. (Contains 200 citations, fully indexed and including a table of contents.)

9B. Computers

AD-A094 064/3 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
A Design Study for an Easily Programmable, High-Speed Processor with a General-Purpose Architecture.
Technical note,
Douglas B. Paul, Joel A. Feldman, and Vincent J. Sferrino. 23 Oct 80, 76p TN-1980-50, ESD-TR-80-217
Contract F19628-80-C-0002, ARPA Order-3336

A design study has been carried out for an easy-to-program high-speed signal processor. The machine achieves a throughput of about 25 million arithmetic operations per second by incorporating parallel addressing and data access into a general-purpose architecture. The study indicates that, for typical signal processing applications, nearly all of the instruction cycles can be used to perform primary arithmetic operations rather than data access or addressing. The proposed machine would require about 1165 ECL 100K chips, occupy 2-3 cubic feet, and consume about 700 watts. (Author)

AD-A094 076/7 PC **A04**/MF **A01**
Computer Systems Management, Inc., Arlington, VA.
Defense Microcomputing in the 1980s: Problems & Research Priorities.
Quarterly technical rept. 1 Oct-31 Dec 80,
James F. Wittmeyer, III. 31 Dec 80, 57p Rept no. CSM-81-01
Contract MDA903-80-C-0155, ARPA Order-3829

This report covers work in the microcomputer systems design area. The technical problems addressed include the evolution of microcomputing, microcomputing logistics, and user psychology. The general methods employed include interactive system design principles identification and examination, substantive area identification, and design, development, demonstration, documentation, and transfer research priority specification. Technical results include the specification of five primary research areas: creative hardware integration, humanistic interactive system designing, interactive interfacing, software production psychology, and unconventional documentation and transfer.

AD-A094 178/1 PC **A03**/MF **A01**
MITRE Corp., Bedford, MA.
ACSAC Network Support Project.
Final rept. 15 Aug-30 Sep 80,
C. J. LaSonde, and M. L. Duffy. Dec 80, 35p
Rept no. MTR-8207
Contract F19628-81-C-0001

This small study effort was a preliminary analysis initiating a requirements concept for HQDA data processing support for the mid-1980's. The report reviews automation support needs and the value, accuracy, access, and timeliness of data required. (Author)

AD-A094 184/9 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL. Dept. of Electrical Engineering and Computer Science.

A Model for Representing the Control Flow and Data Flow of Program Modules.
Stephen S. Yau, and Paul C. Grabow. 1980, 12p
Contract N00014-80-C-0167
Pub. in Proceedings of the International Computer Software and Application Conference (4th), p153-160 Oct 80.

No abstract available.

AD-A094 237/5 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
A Comparative Evaluation of Statistical Image Segmentation Techniques.
Technical rept.,
C. H. Chen. 26 Jan 81, 18p Rept no. SMU-EE-TR-81-3
Contract N00014-79-C-0494

Statistical image segmentation refers to the computer-oriented procedures that partition the image into meaningful parts by using the statistical pattern recognition techniques. Although most image segmentation works have been nonstatistical in nature, there is now strong interest in the use of the supervised and the unsupervised classification techniques for image segmentation. In this paper, a critical comparison is made on the supervised image segmentation techniques including the Fisher's linear discriminant, the autoregressive moving-average modelling, the maximum likelihood region estimation, and the maximum a posteriori region estimation, as well as on the unsupervised image segmentation techniques including the cluster analysis, the estimation-theory based method, histogram directed segmentation techniques, and the decision-directed method using the conditional population mixture model. Some computer results are presented. The fundamental issues in the statistical image segmentation and the related topics are also reviewed. (Author)

AD-A094 241/7 PC **A04**/MF **A01**
Sterling (Theodor D.) Ltd., Vancouver (British Columbia).
Digital Representation of Three-Dimensional Surfaces by Triangulated Irregular Networks (TIN). REVISED.
Technical rept.,
Thomas K. Peucker, Robert J. Fowler, James J. Little, and David M. Mark. Oct 76, 73p Rept no. TR-10
Contract N00014-75-C-0886

A Geographic Data Structure is developed which permits the digital acquisition, storage and application of data sets of three or more dimensions, in particular topographic terrains. The Structure consists of a Triangulated Irregular Network and higher-level structures. Comparisons with systems based on regular grids reveal that the Geographic Data Structure is advantageous in terms of storage space needed, computer time, and accuracy, in the acquisition, storage and application of digital terrain.

AD-A094 281/3 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
Some Experimental Results on Linear Estimation for Image Analysis.
Technical rept.,
C. H. Chen, Rong-Hwang Wu, and Chihsung Yen. 28 Jan 81, 19p Rept no. SMU-EE-TR-81-4
Contract N00014-79-C-0494

Based on a constructed textured subimage, an experimental comparison is made on the three linear estimation methods for image segmentation, namely the maximum likelihood estimation, the maximum a posteriori estimation and the Fisher's linear discriminant. The last two methods are shown to be feasible for effective image segmentation. (Author)

AD-A094 339/9 PC **A03**/MF **A01**
Maryland Univ., College Park. Computer Vision Lab.
Three-Dimensional Digital Topology: The Genus.
Interim rept.,
David G. Morgenthaler. Nov 80, 46p TR-980, AFOSR-TR-81-0061
Grant AFOSR-77-3271

This report is one of a series on the geometrical and topological properties of three-dimensional digital images. In this report, we define the genus of a subset of a three-dimensional array and show that the properties of this digital genus are consistent which those of the genus in ordinary (continuous) topology. Since the approach here is different than that normally used in two dimensions, we also present the two-dimensional case. The derivation of the three-dimensional genus allows us to make explicit what is meant by a hole in an object (e.g., the hole in a ring). We also give algorithms for computing the three-dimensional digital genus and discuss the importance of three-dimensional genus in contrast with the two-dimensional genus. (Author)

AD-A094 340/7 PC **A03**/MF **A01**
Maryland Univ., College Park. Computer Vision Lab.
Parallel Computers for Region-Level Image Processing.
Interim rept.,
Azriel Rosenfeld, and Angela Y. Wu. Nov 80, 34p TR-978, AFOSR-TR-81-0060
Grant AFOSR-77-3271

It is well known that parallel computers can be used very effectively for image processing at the pixel level, by assigning a processor to each pixel or block of pixels, and passing information as necessary between processors whose blocks are adjacent. This paper discusses the use of parallel computers for processing images at the region level, assigning a processor to each region and passing information between processors whose regions are related. The basic difference between the pixel and region levels is that the regions (e.g., obtained by segmenting the given image) and relationships differ from image to image, and even for a given image, they do not remain fixed during processing. Thus one cannot use the standard type of cellular parallelism, in which the set of processors and interprocessor connections remain fixed, for processing at the region level. Reconfigurable cellular computers, in which the set of processors that each processor can communicate with can change during a computation, are more appropriate. A class of such computers is described, and general examples are given illustrating how such a computer could initially configure itself to represent a given decomposition of an image into regions, and dynamically reconfigure itself, in parallel, as regions merge or split. (Author)

AD-A094 354/8 PC **A03**/MF **A01**
Maryland Univ., College Park. Computer Vision Lab.
Spatial Autoregressions in Digital Image Restoration: Simultaneous Models.
Interim rept.,
R. Chellappa. Dec 80, 26p TR-984, AFOSR-TR-81-0059
Grant AFOSR-77-3271

We consider the application of spatial autoregressive random field models in the restoration of degraded images. The degradation is assumed to be due to a space invariant, periodic, nonseparable point spread function and additive noise, colored or white. We assume that the images are represented by two-dimensional spatial autoregressive models and we develop fast, optimal, non-recursive filters, the optimality criterion being the minimum mean squared error (MMSE). Within the class of spatial autoregressive models, there are two nonequivalent classes of random field (RF) models, the so-called simultaneous autoregressive (SAR) models and the conditional Markov (CM) models. In this paper, we develop restoration algorithms and give examples of restoration using the SAR models. The restoration filter is optimal, if the parameters characterizing the RF models are known exactly. In practice, however, they are estimated from the images. An iterative scheme is used for the estimation of parameters in SAR models. Performance bounds of restoration algorithms are calculated. In a subsequent paper, the case of CM models will be considered. (Author)

AD-A094 375/3 PC **A02**/MF **A01**
Maryland Univ., College Park. Computer Vision Lab.
Digital Straightness and Convexity.
Interim technical rept.,
Azriel Rosenfeld, and Chul E. Kim. Dec 80, 25p TR-990, AFOSR-TR-81-0058
Grant AFOSR-77-3271

This tutorial paper reviews the subjects of digital straightness and convexity. The central questions treated are: When can a digital arc be the digitization of a real straight line segment. When can a digital object be the digitization of a real convex set. (Author)

AD-A094 408/2 PC **A07**/MF **A01**
Ohio State Univ., Columbus. Computer and Information Science Research Center.
Design and Analysis of Update Mechanisms of a Database Computer (DBC).
Technical rept.,
David K. Hsiao, and M. Jaishankar Menon. Jun 80, 133p Rept no. OSU-CISRC-TR-80-3
Contract N00014-75-C-0573

This report shows how the process of update is carried out in the database computer (DBC) which is a specialized back-end database machine capable of managing data of 10 to the 10 power bytes in size. Since DBC might often have to be used in an update-intensive environment (that is, an environment where many update, delete and insert commands and only a few retrieve commands are issued), we have indicated throughout this report, the kind of architectural enhancements which will provide good performance in an update-intensive environment. Perhaps the most important enhancement that affects the performance of all the four types of requests in DBC (retrieve, delete, insert and update) is the incorporation of a track-size buffer with each TIP. The advantages that accrue as a result of the incorporation are clearly demonstrated in the various sections of the report.

AD-A094 485/0 PC **A02**/MF **A01**
General Research Corp., Santa Barbara, CA.
An Automated Program Testing Methodology and its Implementation.
Interim rept.,
Dorothy M. Andrews, and Jeoffrey P. Benson. 1980, 10p AFOSR-TR-81-0057
Contract F49620-79-C-0115

This paper describes an automated testing methodology and an experiment performed to determine its effectiveness. The method is to insert in the program to be tested a number of 'executable assertions,' statements about the program that trigger error signals whenever they are evaluated to be false violated). A testcase is then developed for the program using actual values of the input variables. When the program is run, a plot is generated of the number of assertions violated versus the input variable values used. The resulting function is called the 'error function.' Heuristic search algorithms can then be used to maximize this function and thereby automatically locate input values which cause the most errors to occur. The experiment included developing assertions for the program to be tested, choosing and inserting representative errors into the program, and implementing search and data collection algorithms for testing. The results indicate that combining executable assertions with heuristic search algorithms in an effective method for automating the testing of computer programs. (Author)

AD-A094 554/3 PC **A10**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Adaptive Notch Filter Suppression of Bending Modes.
Master's thesis,
William L. Marks. Dec 80, 223p

A simple, microprocessor oriented algorithm is developed to identify, track and suppress bending mode signals from a control system's rate and position feedback signals using adaptive digital notch filters. The algorithm can be used to suppress bending modes having center frequencies as close as one octave above the control system gain cross-over frequency without introduction of the excessive phase loss associated with conventional lowpass filtering techniques. A third order model of the trident missile autopilot pitch attitude control loop is contaminated with two dynamic, destabilizing bending modes and used as a concept demon-

stration model. The algorithm is demonstrated by stabilizing the pitch attitude loop in the presence of two bending modes with unknown gains, damping, center frequencies and rates of change of center frequencies.

AD-A094 566/7 PC **A02**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Proposal for Distribution and Maintenance of the ARPA Standard Version of the UNIX Operating System.
Technical rept.,
R. S. Fabry. 1980, 4p
Contract N00039-80-K-0649, ARPA Order-4031

The ARPA Standard Version of the UNIX Operating System ('the System') shall consist of the original Western Electric Version 7 UNIX software and documentation as modified and enhanced by the contractor according to the Configuration Control Plan.

AD-A094 568/3 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Statistics Programs for the TI-59 Calculator.
Master's thesis,
Richard William Storer. Dec 80, 136p

This paper presents a package of nine programs for the TI-59 calculator. This package was developed as a solution to two problems. One problem involved expanding and modifying an existing set of programs; and a second problem involved developing five distribution approximating programs. The solution to these problems represents a package with considerable capability in computing confidence intervals, performing hypothesis tests and approximating distribution values. The distribution approximations include inverse CDF values for the Normal, Chi-square, Student's t and F distributions, which allow the computation of confidence intervals without using tables. The TI-59 proved to be a useful tool in solving these problems and demonstrated the capability of hand-held programmable calculators. The comprehensive set of user guides included in this programming package provides even the inexperienced user with a step-by-step introduction to this capability. Additionally, the methods used in preparing this programming package are directly applicable to other calculators or computers. (Author)

AD-A094 569/1 PC **A11**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Implementation of Segment Management for a Secure Archival Storage System.
Master's thesis,
John Timothy Wells. Sep 80, 243p

This thesis presents an implementation of segment management for the security kernel of a secure archival storage system. The basis for this implementation is a family of secure, distributed, multi-microprocessor operating systems designed to provide multi-level internal computer security and controlled sharing of data among authorized users. This implementation provides address space management for individual processes, based on segmentation as a memory management scheme. Non-discretionary information security is provided through enforcement of a security policy based on a lattice structure that allows flexibility in representing different security policies; the Department of Defense (DoD) security classification system is the security policy represented in this thesis. Implementation was completed on the ZILOG Z8000 micro-processor. (Author)

AD-A094 604/6 PC **A08**/MF **A01**
Stanford Univ., CA. Dept. of Computer Science.
Theory of Compiler Specification and Verification.
Doctoral thesis,
Wolfgang Heinz Polak. May 80, 154p
Contract MDA903-76-C-0206, Grant NSF-MCS76-00321

The formal specification, design, implementation, and verification of a compiler for a Pascal-like language is described. All components of the compilation process such as scanning, parsing, type checking, and code generation are considered. The implemented language contains most control structures of Pascal, recursive procedures and functions, and jumps. It provides user defined data types including arrays, records, and pointers. A simple facility for input-output is provided. The target language assumes a stack machine including a display mechanism to handle procedure and function calls. The compiler itself is written in Pascal Plus, a dialect of Pascal accepted by the Stanford verifier. The Stanford verifier is used to give a complete formal machine checked verification of the compiler. One of the main problem areas considered is the formal mathematical treatment of programming languages and compilers suitable as input for automated program verification systems. Several technical and methodological problems of mechanically verifying large software systems are considered. Some new verification techniques are developed, notably methods to reason about pointers, fixed points, and quantification. These techniques are of general importance and are not limited to compiler verification. The result of this research demonstrates that construction of large correct programs is possible with the existing verification technology. It indicates that verification will become a useful software engineering tool in the future. Several problem areas of current verification systems are pointed out and areas for future research are outlined. (Author)

AD-A094 609/5 PC **A07**/MF **A01**
SRI International, Menlo Park, CA. Computer Science Lab.
A Verification Condition Generator for FORTRAN.
Technical rept.,
Robert S. Boyer, and J. Strother Moore. Jun 80, 132p Rept no. SRI/CSL-103
Contract N00014-75-C-0816

This paper provides both a precise specification of a subset of FORTRAN 66 and FORTRAN 77 and a specification of the verification condition generator we have implemented for that subset. Our subset includes all the statements in FORTRAN 66 except the following: READ, WRITE, REWIND, BACKSPACE, ENDFILE, FORMAT, EQUIVALENCE, DATA, and BLOCK DATA. We place some restrictions on the remaining statements; however, our subset includes certain uses of COMMON, adjustable array dimensions, function subprograms, subroutine subprograms with side effects, and computed and assigned GO TOs. Unusual features of our system include a syntax checker that enforces all our syntactic restrictions on the language, the thorough analysis of aliasing, the generation of verification conditions to prove termination, and the generation of verification conditions to ensure against such run-time errors as array bound violations and arithmetic overflow. We have used the system to verify several running FORTRAN programs. We present one such program and discuss its verification. (Author)

AD-A094 610/3 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Real-time and Applications Software for the Neil Brown/W.H.O.I. CTD Microprofiler.
Final rept.,
Lawrence J. Rosenblum. 30 Dec 80, 46p Rept no. NRL-8444

The Neil Brown/W.H.O.I. CTD Microprofiler has been extensively used by a variety of NRL researchers in at-sea experiments. This paper reports on software for both real-time data acquisition and display and for processing collected data. (Author)

FIPS PUB 73 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC.
Guidelines for Security of Computer Applications. Category: ADP Operations. Subcategory: Computer Security.
Federal information processing standards (Final),
Stuart Katzke. 30 Jun 80, 60p
Three ring FIPS binder also available, North American Continent price $6.25; all others write for quote.

Security decisions should be an integral part of the entire planning, development and operation of a computer application. This guideline describes the technical and managerial decisions that should be made in order to assure that adequate controls are included in new and existing computer applications to protect them from natural and man-made hazards and to assure that critical functions are performed correctly and with no harmful side effects. The multifaceted nature of computer security is described and differences in security objectives, sensitivity levels, and vulnerabilities that must be considered are identified. Fundamental security controls such as data validation, user identity verification, authorization, journalling, variance detection and encryption are discussed as well as security-related decisions that should be made at each stage in the life cycle of a computer application.

PAT-APPL-6-208 355 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Multiple-Microcomputer Processing.
Patent Application,
Charles F. Summer, Robert O. Pettus, Ronald D. Bonnell, Michael N. Huhns, and Larry M. Stephens. Filed 19 Nov 80, 21p AD-D008 016/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The architecture of a special-purpose multiprocessor is described which is hierarchically structured and functionally distributed, having distributed cache memory for local processing and a common applications task manager in each microcomputer. A group of identical microcomputers execute the total program in an intrinsically parallel mode within the frame times scheduled by a system state control microcomputer. (Author)

PB81-149809 Not available NTIS
National Bureau of Standards, Washington, DC.
A Survey of Computer-Based Password Techniques.
Final rept.,
H. M. Wood. 1980, 6p
Pub. in Chapter 7 in Advances in Computer Security Management, p140-145 1980.

The report surveys passwords and their effective application to the problem of controlling access to computer resources. After describing the need for and uses of passwords, password schemes are categorized according to selection technique, lifetime, physical characteristics, and information content. Password protection, both in storage and transmission, is dealt with in the next section, followed by brief sections on current implementations and cost considerations.

PB81-158545 PC **A13**/MF **A01**
Office of Management and Budget, Washington, DC. Office of Information and Regulatory Affairs.
Major Data Processing and Telecommunications Acquisition Plans of Federal Executive Agencies 1981-1986.
Jan 81, 279p

The document is a compilation of Federal executive agency plans for major acquisitions of general purpose data processing and telecommunication systems, facilities, and related services from FY 1981 through FY 1986. These plans are being published in order to: provide advance planning information to assist GSA in carrying out their procurement responsibilities under P.L. 89-306; to provide advance planning information to Congress; and to facilitate competition by providing advance planning information to industry. Major acquisitions are defined as acquisitions which have a system life cost of more than $1 million during FY 1981 through FY 1986. The publication of this compilation of agency acquisitions plans by OMB should not be interpreted as OMB approval of resources beyond FY 82 nor should it be interpreted as OMB approval of any specific acquisition or any specific method of procurement.

PB81-801854 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Data Compression. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Dec 80, 271p
Supersedes PB80-801632, and NTIS/PS-78/1247.

The bibliography cites Government-sponsored research studies on techniques and equipment for

data compression. Reports are included on video communications, telemetry, voice communications, data management, and computer storage devices. (This updated bibliography contains 263 citations, 29 of which are new entries to the previous edition.)

PB81-801862 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Data Compression. 1978-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-Dec 80.
Dec 80, 105p
Supersedes PB80-801657, and NTIS/PS-78/1248.

The bibliography of worldwide journal literature cites research on techniques and equipment for data compression. Reports on video communications, data management, and computer storage devices are included. (This updated bibliography contains 97 citations, 7 of which are new entries to the previous edition.)

PB81-802688 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Computer Performance Evaluation. 1970-1980 (Citations from the NTIS Data Base).
Rept. for 1970-80.
Jan 81, 289p
Supersedes PB80-802085, and NTIS/PS-78/1078.

The bibliography cites research on the measurement of computer systems effectiveness. It includes studies on workload determination, computational efficiency, and techniques for performance evaluation of both hardware and software. (This updated bibliography contains 285 citations, 46 of which are new entries to the previous edition.)

PB81-802712 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Random Access Memories. 1978-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-Dec 80.
Jan 81, 249p
Supersedes PB80-802358, and NTIS/PS-78/1222.

Research on the design, development, and application of random access computer storage devices is cited in this bibliography of worldwide journal literature. Research on charge coupled devices in random access storage, random access memories in microprocessor applications, and reliability of random access memories are included. (This updated bibliography contains 240 citations, 83 of which are new entries to the previous edition.)

PB81-802746 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Random Access Memories. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 239p
Supersedes PB80-802333, and NTIS/PS-78/1221.

The bibliography cites Government-sponsored research reports on the design, development, and application of random access storage devices and materials. Studies are included on wall placement techniques, domain wall observations, microcircuitry, and software development. (This updated bibliography contains 196 citations, 26 of which are new entries to the previous edition.)

9C. Electrical and Electronic Engineering

PATENT-4 238 716 Not available NTIS
Department of the Air Force, Washington, DC.
Miniature Vehicle Dispenser Spin-up Speed Control System.
Patent,
William G. Redmond. Filed 27 Sep 78, patented 9 Dec 80, 5p AD-D008 055/6, PAT-APPL-946 288
Supersedes PAT-APPL-946 288-78, AD-D005 576.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A precision motor speed control system where a reference generator produces pulses for each revolution of a dispenser shaft, the time between pulses is measured and compared to a preselected standard, a time greater than standard will generate a pulse causing a transistor circuit to apply an accelerating voltage to the motor, a time less than the standard will generate a pulse causing a transistor circuit to apply a decelerating voltage to the motor. (Author)

PB81-139529
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Electrical Engineering at the University of Manchester,
I. Kaufman. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p276-278, 30 Jun 80.

No abstract available.

PB81-139537
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Electrical Engineering and Electronics at UMIST,
I. Kaufman. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p278-280, 30 Jun 80.

No abstract available.

9D. Information Theory

AD-A094 052/8 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
On Polynomial Nonlinearities for Detection in phi-Mixing Noise,
Don R. Halverson, and Gary L. Wise. 1979, 6p
AFOSR-TR-80-1302
Contract F49620-77-C-0101, Grant AFOSR-76-3062
Pub. in the Proceedings of the Midwest Symposium on Circuits and Systems (22nd) p504-508, 17-19 Jun 79.

No abstract available.

AD-A094 053/6 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Some Results on Asymptotic Memoryless Detection in Strong Mixing Noise.
Interim rept.,
Don R. Halverson, and Gary L. Wise. 1980, 6p
AFOSR-TR-80-1303
Contract F49620-77-C-0101, Grant AFOSR-76-3062
Presented at the Midwest Symposium on Circuits and Systems, (23rd) 4-5 Aug 80, Toledo, OH.

In this work we consider the discrete time detection of strong mixing signals in strong mixing noise, and we allow a large degree of dependency to exist between the signal and the noise. We investigate the memoryless detector which is optimum in the sense of the asymptotic relative efficiency. It is shown that the design of this detector reduces to the solution of an integral equation in which knowledge of only the second-order statistics of the random processes involved is required. (Author)

AD-A094 054/4 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Zero Memory Detection of Random Signals in Phi-Mixing Noise.
Interim rept.,
Don R. Halverson, and Gary L. Wise. 1979, 7p
AFOSR-TR-80-1304
Grant AFOSR-76-3062
Presented at the Conference on Information Sciences and Systems, 26-28 Mar 80, Princeton, NJ.

Design of detectors for phi-mixing signals in phi-mixing noise is considered, where a large degree of dependency may also occur between the signal and noise. Applying the criterion of asymptotic relative efficiency, it is shown that this design reduces to the solution of an integral equation in which knowledge of only the second-order statistics of the random processes involved is required. From this it may be seen that if the signal is independent of the noise and has nonzero mean, the optimal detector is the same as in the constant known signal case. (Author)

AD-A094 238/3 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
On Multichannel (Multivariate) Maximum Entropy Spectral Analysis.
Technical rept.,
C. H. Chen, and Chihsung Yen. 23 Jan 81, 21p Rept no. SMU-EE-TR-81-2
Contract N00014-79-C-0494

After a review of the mathematical theory of the multichannel (multivariate) maximum entropy analysis, the computer programs on the multichannel analysis are developed and applied to the multichannel sinusoids and multichannel geophysical data, and to the segmentation of infrared images. (Author)

AD-A094 261/5 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
A Bibliography on Maximum Entropy Spectral Analysis and Related Techniques.
Technical rept.,
C. H. Chen. 19 Jan 81, 12p Rept no. SMU-EE-TR-81-1
Contract N00014-79-C-0494

An extensive bibliography is provided for univariate and multivariate (multichannel) maximum entropy spectral analysis, two-dimensional maximum entropy spectral analysis, and related high-resolution spectral analysis techniques. (Author)

AD-A094 603/8 PC **A02**/MF **A01**
Southeastern Massachusetts Univ., North Dartmouth. Dept. of Electrical Engineering.
Some Results in Noise Filtering by Use of Local Statistics.
Technical rept.,
P. F. Yan, and P. F. Li. 30 Jan 81, 11p Rept no. SMU-EE-TR-81-6
Contract N00014-79-C-0494

An alternative approach is presented for the noise filtering using local statistics, a problem recently considered by Jong-Sen Lee. For the multiplicative noise case improved filtering by the new method is demonstrated by experimental results. (Author)

9E. Subsystems

AD-A094 068/4 PC **A05**/MF **A01**
Illinois Univ. at Urbana-Champaign. Electromagnetics Lab.
A Study of Microstrip Antenna Elements and Arrays.
Interim rept.,
Y. T. Lo, W. F. Richards, and P. Simon. Dec 80, 81p RADC-TR-80-363
Contract F19628-78-C-0025

Thin microstrip antennas have many unique and attractive properties, but their operation is much limited in bandwidth. In this report an attempt is made to develop a procedure for array design, in particular, to determine whether or not the band of operation could be broadened by using a small array of two elements of slightly different dimensions. By broadband, it is meant that the antenna must have over the bandwidth: (1) an input impedance variation within a certain prescribed SWR

(say 3:1); (2) a stable pattern (in particular a stable beam-pointing direction); (3) a small variation in gain (or efficiency); and (4) in some applications, small variations in beamwidth and sidelobe level. In this work only the first two fundamental performances are considered. Insofar as the impedance is considered, the array design is essentially a circuit problem. Our theory based on the cavity model has previously shown that the element impedance can adequately be described by a Foster network representation, namely, a series circuit of infinitely many parallel resonant circuits, each corresponding to a mode of the cavity. For frequencies in the vicinity of a certain mode, the circuit can further be reduced to a single parallel resonant circuit of that mode in series with an inductance. Our earlier investigation has also shown that, except for very close spacings, the mutual coupling effect between elements can be ignored.

AD-A094 260/7 PC **A02**/MF **A01**
Philips Labs., Briarcliff Manor, NY.
Development of an Electrophoretic Image Display.
Quarterly technical rept. no. 5, 1 Aug-31 Oct 80,
Richard Liebert, Joseph Lalak, and Karl Wittig.
Nov 80, 14p
Contract MDA903-79-C-0439, DARPA Order-3802

The purpose of this work is to develop a 350 x 600 element X-Y addressed electrophoretic image display (EPID). The ion-beam milling process now routinely removes all of the Mylar from the potential wells without destroying the underlying electrode. A number of devices having the 512 character format were fabricated and tested. Interelectrode shorts were found in these displays, and measures are being taken to determine and eliminate their causes. Several of the devices were fabricated with sputtered In2O3/ SnO2 (ITO) grid electrodes, these clearly demonstrated the improved contrast expected by replacing the aluminum grid electrode with an ITO electrode. An evaporation system was set up to deposit In2O3. This process is more reproducible than sputtering and gives more transparent films of higher conductivity. Construction of the driver and the interconnection system is complete. The software for the driver has been written. Debugging of the driver and software awaits the availability of a display substantially free of shorts. (Author)

AD-A094 263/1 PC **A03**/MF **A01**
Rockwell International, Thousand Oaks, CA. Electronics Research Center.
Monolithic GaAs Superhyeterodyne Front End.
Progress rept. no. 1, 15 Aug 78-14 Aug 79,
Aditya K. Gupta, Wendell Petersen, and D. R. Ch'en. May 80, 44p Rept no. ERC41014.1PR
Contract N00014-78-C-0624

This report describes the progress during the first phase of the development of a monolithic Gallium Arsenide Superheterodyne Front End for the 8GHz military satellite communications band. The integrated GaAs receiver chip is to be fabricated using the monolithic microwave integrated circuit (MMIC) approach. It will contain an RF preamplifier, an FET mixer, and an IF amplifier. A monolithic GaAs local oscillator will be developed under a separate program. This report describes the design and the fabrication of the three circuits to be integrated. Functional monolithic circuits have been fabricated and are being characterized at present. The IF amplifier has shown 8.0 + or - 1.5 db gain and 6.35 db maximum noise figure in the 500 - 1000 MHz frequency band. RF performance of the preamplifier and the mixer will be described in the next report. (Author)

BDX-613-2409 PC **A02**/MF **A01**
Bendix Corp., Kansas City, MO.
Modified Thin Film Processing Sequence.
C. R. Baxter. Jun 80, 20p
Contract AC04-76DP00613

A modified thin film processing sequence in which tantalum nitride (TA sub 2 N) resistors are stabilized prior to chromium/gold (Cr/Au) evaporation was investigated, and the effects of subsequent processing on unstabilized Cr/Au films were determined. Thin films evaporated using the modified process yielded results similar to those of films evaporated using the standard processing techniques. Work on the modified process was discontinued because of some metallization adhesion failures at the Cr/Au-to-Ta sub 2 N interface, higher contact resistance, and the additional steps required in processing. (ERA citation 06:004059)

PAT-APPL-6-203 197 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Balanced Impedance Coupler.
Patent Application,
Frank R. Previti. Filed 4 Nov 80, 13p AD-D008 014/3
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A balanced preamplifier is disclosed for impedance-coupling an audio signal source, such as a microphone, to a differential amplifier. In one embodiment, the preamplifier comprises a first stage wherein a pair of complementary bipolar transistors are connected in a common-base configuration and coupled to a low-impedance microphone so that the microphone signal is applied to the respective emitters of the transistors and transformed to an appropriately higher impedance level at the respective collectors thereof with common-mode passage of external and internal noise. A second stage including a complementary pair of bipolar transistors in a common-emitter configuration is coupled to the first stage for greater power and voltage amplification requirements. In a second embodiment, the preamplifier comprises a pair of complementary field-effect transistors (FET) connected in a series common-drain configuration and coupled to a high-impedance microphone so that the microphone signal is applied to the respective gates of the FETs and transformed to an appropriately lower impedance level at the respective sources thereof with common-mode passage of noise. (Author)

PAT-APPL-6-205 361 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Line Source Antenna for Electronic Beam Scanning.
Patent Application,
Richard A. Stern. Filed 10 Nov 80, 11p AD-D008 010/1
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The basic principles and operation of the monolithic line source antenna array with radiating slots, as covered by this application, are the same as described in US Patent 4,092,647, which is incorporated by reference. Structural differences are described below. The principal change is that in place of a separate ferrite phase shifter in each cell between adjacent slots, a single long ferrite toroid is utilized for all of the cells and slots. a ferrite phase shift element with matching transformers is shown. It comprises the ferrite toroid 10 and two dielectric matching transformers 12 at the ends. A hole 14 is provided for the switching wire. A cross-sectional view of the toroid is also shown. The inside of the toroid 10 is filled with a dielectric material 16. A monolithic line source antenna array having 15 radiating slots is shown. It is formed by either enclosing the phase shift element in a close fitting waveguide housing, or alternatively by applying a metal coating to the phase shift element. The fifteen slots 20 are formed through the metal on one of the broad faces. The switching wire 18 extends through the hole of the toroid. The dielectric matching transformers 12 are not shown. (Author)

PAT-APPL-6-206 130 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Multi-Sampling-Channel Pulse Compressor.
Patent Application,
Bernard L. Lewis, and Frank F. Krestschmer, Jr. Filed 6 Nov 80, 22p AD-D008 003/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a digital pulse compression processor for reducing the processing loss in target-echo signals caused by sampling time errors. This system consists of a first processing channel for sampling the echo signal in accordance with pulses from a first clock signal and a second processing channel for sampling the echo signal in accordance with pulses from a second clock signal at the same sampling frequency as the first clock signal but with its pulses interlaced, in time, approximately midway between the pulses of the first clock signal to ensure that the largest sampling error will be one-quarter of a sampling period or less. The sampled signals in each channel are then digitized and compressed, and then processed to form the compressed signal envelope. The resultant signal envelopes from each channel are multiplied together to form a low-side-lobe narrow output pulse.

PAT-APPL-6-213 529 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
High Speed Digital to Analog Converter Circuit.
Patent Application,
Herbert Berke, and Paul Smith. Filed 5 Dec 80, 23p AD-D008 019/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A high speed digital to analog converter circuit for converting a plurality of data bytes to corresponding analog signals at very high conversion rates. A computer image generator provides in response to each clock pulse of a first clock signal a set of eight data bytes. Each set of data bytes are then latched alternatively in first storage means or second storage means. Multiplexing means alternatively samples each set of data bytes latched in said first and second storage means, and an octet of digital to analog converters then converts each set of data bytes to a corresponding set of eight analog signals. Gating means, in turn, sequentially passes each set of analog signals so as to form at its output a video information signal which may be utilized to activate an image display apparatus. (Author)

PAT-APPL-6-214 601 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Monolithic Fully Integrated Class B Push-Pull Microwave FET.
Patent Application,
Max Yoder. Filed 9 Dec 80, 15p AD-D008 020/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A class B microwave, push-pull, balanced amplifier and an amplifying element for use in the amplifier. A field effect transistor having at least two gates, two drains and a common source is in circuit with a center-tapped output transformer connected across the drains. A branch including a DC voltage source connects the center-tap of the transformer and the common source of the field effect transistor. Parasitic loss mechanisms associated with the source contacts and leads are eliminated because the current in the branch connecting the source to the transformer is not at the signal frequency. The FET can comprise a semiconductor body having alternating drain and source electrodes with gate electrodes there between. Source electrodes are connected in common. Alternate drain electrodes are connected to one input terminal; the remaining drain electrodes are connected to the other output terminal. The two gate electrodes lying between any two consecutive drain electrodes are respectively connected to opposite input terminals. (Author)

PATENT-4 218 685 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Coaxial Phased Array Antenna.
Patent,
H. Ellis, Jr. Filed 17 Oct 78, patented 19 Aug 80, 12p N81-14187/1, PAT-APPL-953 313
Supersedes PAT-APPL-953 313-78, N79-19194 (17 - 10, p 1262). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A coaxial antenna array for communicating circularly polarized electromagnetic radiation is disclosed. A pair of open ended antenna cavities is coaxially constructed and operates by excitation of linear radiation elements arranged within each of the cavities. A pair of crossed dipole radiation de-

vices is centered within the inner cavity and operated by means of a phase shifting network circuit to transmit as well as receive circularly polarized radiation. Four monopole radiation devices are symmetrically arranged to operate in the outer cavity in phase quadrature by means of the phase shifting network circuit to both transmit and receive circularly polarized electromagnetic radiation. Combined operation of the two antenna cavities with a 180 deg phase differential between the fields related to the two antenna cavities provides a broad beam, relatively wide frequency bandwidth communication capability. Particular embodiments disclosed feature a generally square cavity array as well as a circular cavity array.

PATENT-4 222 098 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Base Drive for Paralleled Inverter Systems.
Patent,
S. Nagano. Filed 16 Feb 78, patented 9 Sep 80, 5p N81-14220/0, PAT-APPL-878 541
Supersedes PAT-APPL-878 541-78, N78-22376 (16 - 13, p 1705). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

In a paralleled inverter system, a positive feedback current derived from the total current from all of the modules of the inverter system is applied to the base drive of each of the power transistors of all modules, thereby to provide all modules protection against open or short circuit faults occurring in any of the modules, and force equal current sharing among the modules during turn on of the power transistors.

PATENT-4 228 437 Not available NTIS
Department of the Navy, Washington, DC.
Wideband Polarization-Transforming Electromagnetic Mirror.
Patent,
J. Paul Shelton. Filed 26 Jun 79, patented 14 Oct 80, 6p AD-D008 030/9, PAT-APPL-6-052 298
Supersedes PAT-APPL-6-052 298, AD-D006 158.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A reflecting mirror for transforming the polarization of electromagnetic (EM) waves independently of the frequency of the waves and, thus, over an arbitrarily wide RF bandwidth includes two interleaved sets of planar arrays of resonant elements, both being orthogonally polarized, and each set comprising layers of the arrays which are arranged so that the layered elements of each set form a log-periodic configuration. The difference in phase between the reflection coefficient functions of the first and second sets of arrays is independent of the frequency of EM waves. Each of the arrays resonate at a different frequency and the arrays resonate over the frequency band of operation. A plane EM wave, the polarization of which has two vector components, strikes the mirror on the array having the shortest strips. The two polarization components of the wave travel into the mirror. Each component is reflected as it encounters strips of an array having a resonance which matches the resonant frequency of the component. The components being non-parallel to each other are reflected from different arrays which causes the components to change in phase relative to each other, thereby transforming the polarization of the wave. (Author)

PATENT-4 233 606 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Frequency Translating Phase Conjugation Circuit for Active Retrodirective Antenna Array.
Patent,
R. C. Chernoff. Filed 29 Dec 78, patented 11 Nov 80, 10p N81-14185/5, PAT-APPL-974 471
Supersedes PAT-APPL-974 471-78, N79-14277 (17-05, p 0585). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An active retrodirective antenna array which has central phasing from a reference antenna element through a 'tree' structured network of transmission lines utilizes a number of phase conjugate circuits (PCCs) at each node and a phase reference regeneration circuit (PRR) at each node except the initial node. Each node virtually coincides with an element of the array. A PCC generates the exact conjugate phase of an incident signal using a phase locked loop which combines the phases in an up converter, divides the sum by 2 and mixes the result with the phase in a down converter for phase detection. The PRR extracts the phase from the conjugate phase. Both the PCC and the PRR are not only exact but also free from mixer degeneracy.

PATENT-4 234 852 Not available NTIS
Department of the Navy, Washington, DC.
Coherent Frequency Shift Key Demodulator.
Patent,
John W. McCorkle. Filed 15 Nov 78, patented 18 Nov 80, 9p AD-D008 038/2, PAT-APPL-960 992
Supersedes PAT-APPL-960 992-78, AD-D005 600.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Disclosed is a frequency shift key demodulator for the coherent detection of both mark and space tones. Cross coupled phase locked loops lock onto and track the difference in frequency between translated mark and space tones. An additional set of cross coupled phase locked loops locks onto and tracks overall frequency drift of the mark and space tones. Signals are generated within the first set of cross coupled loops allowing for coherent detection thereby permitting detection during signal to noise ratios of less than one. Loop bandwidths can be independently controlled and are independent of the data rate thus permitting wide system flexibility.

PATENT-4 238 747 Not available NTIS
Department of the Air Force, Washington, DC.
Mode Filtering Apparatus.
Patent,
Robert S. Harp, and Kenneth J. Russell. Filed 10 Aug 79, patented 9 Dec 80, 12p AD-D008 056/4, PAT-APPL-6-065 678
Supersedes PAT-APPL-6-065 678, AD-D006 757.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

This invention relates to a mode filter apparatus for preventing unwanted modes in a multi-moded structure utilizing a radial plurality of resonant slots on the bottom of the filter cavity. The top of the filter cavity includes a variable height center section to provide mode selectivity in cooperation with the resonant slots.

PATENT-4 238 827 Not available NTIS
Department of the Air Force, Washington, DC.
Interferogram Synthesization Method and Apparatus.
Patent,
Joseph M. Geary, and David F. Holmes. Filed 20 Nov 78, patented 9 Dec 80, 17p AD-D008 058/0, PAT-APPL-962 411
Supersedes PAT-APPL-962 411-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Real time presentation and evaluation of any selected interferogram is realized by electronically simulating optical aberration patterns and displaying them on a cathode ray tube (CRT). The optical aberration patterns include PISTON; X and Y TILT; DEFOCUS; SPHERICAL; COMA; and ASTIGMATISM. The aberration patterns are generated electronically in response to the CRT beam sweep drive signal and are displayed as a function of CRT beam intensity. Any combination of aberration patterns, each having selectable coefficients, can be displayed. The aberration pattern coefficient values are indicated by a digital readout. Evaluation of an unknown interferogram is accomplished by varying aberration pattern combinations and coefficients until a substantial match with the unknown interferogram is achieved. The contributing aberration patterns are then known and their magnitudes are determined from the digital read-out. (Author)

PATENT-4 242 635 Not available NTIS
Department of the Air Force, Washington, DC.
Apparatus and Method for Integrated Circuit Test Analysis.
Patent,
Daniel J. Burns. Filed 26 Jan 79, patented 30 Dec 80, 9p AD-D008 065/5, PAT-APPL-6-006 839
Supersedes PAT-APPL-6-006 839, AD-D005 868.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An integrated circuit test analysis apparatus for visually interpreting voltage changes of active circuit components uses the electro-optic display effect of circuit electric field upon the liquid crystal layer which is applied over the circuit being tested. The normal state duty cycles in a repeating sequence of test states of the integrated circuit is modified by causing the integrated circuit to pause or maintain a particular state at one or more specific time periods for a predetermined time interval to permit the display to be recorded. (Author)

PB81-857401 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Discriminators for Timing Applications. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Jan 81, 64p NERACEDBNT2877
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning pulse discrimination techniques and technology utilized in timing circuits and devices for the timing and time resolution of pulses in general and of specific types of pulses in particular. It includes a wide variety of applications for the pulse discriminators. (Contains 62 citations, fully indexed and including a table of contents.)

PB81-857419 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Discriminators for Counters and Detectors. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Jan 81, 120p NERACEDBNT2878
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning pulse discriminators used in solid and liquid scintillation detectors, scintillation counters, various types of spectrometers, and radiation detectors. The theory, techniques, and applications of pulse detection and counting devices are covered. (Contains 120 citations, fully indexed and including a table of contents.)

10.

ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

AD-A094 319/1 PC **A15**/MF **A01**
California Academy of Sciences, San Francisco.
Dispersed, Decentralized and Renewable Energy Sources: Alternatives to National Vulnerability and War.
Final rept. Jul 79-Dec 80,
John McCasker, and Wilson Clark. Dec 80, 342p
Contract DCPA01-79-C-0320

Section 1 and 2 of this report contains background information on centralized energy systems and the relationship between vulnerability of these systems, energy planning, and existing civil defense programs. Section 3 and 4 contain an extensive investigation, review and categorization of alternative approaches to centralized, vulnerable energy systems; a review of dispersed and renewable technologies which can be appropriately implemented at the local level; and matrices for evaluation of these technologies for emergency and crisis planning. Specific recommendations to FEMA are included on the use of localized energy approaches for emergency response and recovery situations. (Author)

AD-A094 428/0 PC **A05**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Systems and Logistics.
An Examination of Energy Considerations in the Product Acquisition Process.
Master's thesis,
Michael K. McCullough. Dec 80, 79p Rept no. AFIT-LSSR-86-80

The conservation of energy through the acquisition process has become a significant concern to the Air Force in recent years. Therefore, an examination of energy considerations in product acquisitions was conducted. The study constructs a taxonomy of energy costs incurred by the producer and owner of energy consuming products. The categories of the taxonomy include energy costs associated with product research and development, product production and construction, product operation and support, and product retirement and disposal. Examples of energy cost models are presented for each energy cost category listed above. These include facility energy consumption models, transportation energy use models, and production process optimization models. Examples of cost models to aid in the comparison of energy effectiveness among products in the source selection process are also presented and include scoring models, economic index and comparative models, and life cycle costing models.

AD-A094 559/2 PC **A03**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Energy for Tomorrow: An Issue for Today.
Master's thesis,
Leonard Paul Zakas. Sep 80, 50p

A methodology is presented for the development of actions needed to resolve the energy crisis. Identified is a three point program: (1) Describe an energy future for the United States based on the depletion of conventional energy sources, (2) Define the government's administrative and financial role for achieving this future, and (3) Channel government research, testing and procurement funds to the private and business sectors so that the development of appropriate technologies can commence. It discusses the inter-relationships among the various segments of society, economic interests and political forces as they relate to the energy problem. The author concludes that all of these elements must be analyzed in order to solve effectively America's energy crisis. (Author)

HRP-0902655/0 PC **A04**/MF **A01**
Chi Associates., Inc., Arlington, VA.
Energy Implications for National Health Policy - Findings and Final Report. Part I.
1980, 75p
Contract PHS-232-78-0152
See also Part 2, HRP-0902656 and Part 3, HRP-0902657.

With a multidisciplinary team experienced in health care administration, energy management, control technology, data generation, collection and analysis, CAI addressed the following: Development of initial questionnaire; Distribution of initial questionnaire; Statistical analysis of responses; The impact of training and technical information provided by the Energy Action Staff on participants to the EAS conferences; and Hypothesis testing.

HRP-0902656/8 PC **A07**/MF **A01**
Chi Associates., Inc., Arlington, VA.
Energy Implications for National Health Policy - Findings and Final Report. Part II.
1980, 146p
Contract PHS-232-78-0152
See also Part 1, HRP-0902655 and Part 3, HRP-0902657.

In order to collect additional information for an assessment of the overall awareneness of energy problems by health care facilities, CAI developed a second questionnaire as a survey instrument and selected appropriate health care organizations as data collection sites.

HRP-0902657/6 PC **A02**/MF **A01**
Chi Associates., Inc., Arlington, VA.
Energy Implications for National Health Policy - Findings and Final Report. Part III.
1980, 19p
Contract PHS-232-78-0152
See also Part 1, HRP-0902655 and Part 2, HRP-0902656.

It has been estimated that, hospitals alone, consume approximately 15% of all energy used in the Nation's commercial structures, and thus have a large potential for energy conservation. The 221 Health Care Facilities responding to the questionnaire in this project with energy consumption data consumed 16.0 trillion BTU in 1978. If only a 5% overall savings could be accrued, this would mean the conservation of 800 billion BTU of energy annually. For those 221 hospitals it would also mean a savings of approximately $2,660,000 at 1978 energy price levels.

PATENT-4 219 926 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Method and Apparatus for Fabricating Improved Solar Cell Modules.
Patent,
J. T. Bloch, R. T. Hanger, and F. W. Nichols.
Filed 23 Feb 79, patented 2 Sep 80, 6p N81-14389/3, PAT-APPL-6-014 664
Supersedes PAT-APPL-6-014 664, N79-18446 (17 - 09, p 1156). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method and apparatus for fabricating an improved solar cell module is described. The apparatus includes a supply drum for feeding a flexible strip having etched electrical circuitry deposited on it a supply drum for feeding into overlying engagement with the flexible strip a flexible tape having a pair of exposed tacky surfaces, and a plurality of rams for receiving and depositing a plurality of solar cells in side-by-side relation on an exposed tacky surface of the tape in electrical contacting engagement with the etched circuitry.

PB81-139495
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Muddling Through or Modeling Through,
R. E. Machol. 30 Jun 80, 5p
Included in European Scientific Notes, v34 n6 p267-271, 30 Jun 80.

No abstract available.

PB81-144701 Not available NTIS
National Bureau of Standards, Washington, DC.
Standard Procedures for Collector Performance Testing. Chapter 15,
James E. Hill. 1980, 24p
Sponsored in part by Department of Energy, Washington, DC.
Pub. in Chapter 15 in Solar Energy Technology Handbook, Part A. Engineering Fundamentals. Energy, Power and Environment/6, p457-480 1980.

This paper reviews the basic concepts used in testing solar collectors for thermal performance and then describes in detail the adopted consensus standard test method, ASHRAE Standard 93-77. It presents typical results obtained for flat-plate collectors using the Standard, how the method can be used for concentrating collectors, how to calculate cooling performance for a collector using the test results, and some recent developments in the collector testing field.

PB81-153249 PC **A04**/MF **A01**
Illinois Inst. of Tech., Chicago. Dept. of Chemical Engineering.
Fluidization Using Non-Equilibrium Thermodynamics.
Annual rept. Jan 79-Dec 80,
Dimitri Gidaspow, Bozorg Ettehadieh, and Chungliang Lin. Dec 80, 75p GRI-80/0014
Contract GRI-5014-363-0137
See also report dated Dec 79, PB80-219207.

A reasonable computer solution to transient two dimensional fluidization was obtained and compared with laboratory void fraction data. The first objective was to develop a hydrodynamic theory of fluidization using the entropy production principle and separate phase mass and momentum balances. The second objective was to compare various hydrodynamic theories of fluidization to themselves and to experimental evidence. It appears that eventually it may be possible to design fluidized bed reactors starting from first principles.

PB81-153272 PC **A04**/MF **A01**
West Virginia Univ., Morgantown.
Coal Gasification Availability Analysis.
Annual rept. Aug 79-Sep 80,
C. Y. Wen. Sep 80, 59p GRI-79/0075
Contract GRI-5014-361-0197

An availability analysis technique was applied to coal gasification in order to develop an easy method for determining the practical thermodynamic efficiencies of coal gasification processes and the unit operations involved in these processes. Availability analyses, based on both the first and second laws of thermodynamics, have been made on the Lurgi, Texaco, and Exxon gasification processes. These analyses are based on three known sets of thermodynamic reference states and are being compared to a suggested new set of reference states. A computer code for evaluating thermophysical properties of gas mixtures and liquid mixtures is being compiled and further tested.

PB81-153645 PC **A03**/MF **A01**
American Gas Association Labs., Cleveland, OH.
Improvements in Appliance Efficiency. Task II. Improvement of Commercial Cooking Equipment.
Annual rept. for 1979,
R. L. Himmel. Jan 80, 50p GRI-79/0032
Contract GRI-5014-345-0116
Supersedes PB80-210727. See also report dated 22 Jan 80, PB80-210735.

This report describes the continuing efforts of a project aimed at improving the efficiency of gas-fired commercial cooking equipment. It specifically discusses work on deep fat fryers, range oven sections and range open top sections. Two new deep fat fryers were designed and constructed which have an efficiency improvement of 25 percent over conventional units, utilize less frying oil and have improved cleanability. They also differ from conventional units by their tank geometries and the fact that they employ infrared burners. A 45 percent improved range oven section is described which was converted from natural convection to forced convection. Oven capacity heat distribution was improved and the motor horsepower was significantly reduced from that used in normal practice. Initial modifications to range open top burner systems demonstrated a 17 percent reduction in fuel consumption with good combustion.

PB81-856023 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Political Aspects of Energy Policy. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.

Dec 80, 148p NERACEDBNT2515
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the political aspects or ramifications of national and international energy policies relating to energy in general and to specific energy sources, supplies, conservation, and technology. Public opinion of social and economic impacts of energy policies are also covered. (Contains 142 citations, fully indexed and including a table of contents.)

PB81-856031 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Political Aspects of Oil. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 104p NERACEDBNT2517
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning national and international political aspects of the petroleum industry. The politics of interactions among the industry, governments, and society are discussed as it applies to oil from exploration to marketing of petroleum products. (Contains 90 citations, fully indexed and including a table of contents.)

SIB-R-4-1980 PC **A08**/MF **A01**
Swedish Council for Building Research, Stockholm.
Energy Conservation in Houses Built from 1960.
A. C. Andersson, and H. Fjaellstroem. 1980, 155p
In Swedish.
U.S. Sales Only.

In the report an economic evaluation is done of different procedures for energy conservation in one family houses built from 1965 to 1975 in Sweden. The energy consumption has been studied through measurement of heat consumption and through calculations of heat balances. It was concluded that draught preventers for the windows and different procedures lowering the in-door temperature were the most efficient measures. Insulation of different parts of the buildings has also been discussed technically. (ERA citation 06:004993)

STU-77-7289 PC **A03**/MF **A01**
Svenska Gjuterifoereningen, Joenkoeping (Sweden).
Analysis of the Energy Consumption and Study of Energy Conserving Measures in Foundries.
H. Stigmarker. Sep 79, 39p
In Swedish.
U.S. Sales Only.

The study was made at 20 iron, steel, and metal foundries. It is concluded that a development of new techniques is necessary to reduce energy consumption, especially in the metal foundries where the efficiencies are very low. (ERA citation 06:005017)

STU-78-6895 PC **A02**/MF **A01**
Volvo Flygmotor A.B., Trollhaettan (Sweden).
Development of Method and Equipment for Energy Recovery from the Exhaust Gases of the Oil-Fuelled Smelting and Holding Furnaces.
A. Holm. Mar 80, 14p
In Swedish.
U.S. Sales Only.

A heat recovery system has been tested. The system consists of a flat ceramic heat exchanger and a high-temperature burner for pre-heated combustion air. The fuel saving tests were made with a smelting furnace for aluminum. The furnace can be used as a holding furnace and for a combination of smelting and holding. When the modified furnace is used for holding only, there is 50% reduction of fuel consumption. Combined use renders 30 to 35% saving of fuel. The yearly savings are about 75,000 Skr in this case. Long time tests (about 5000 h) show no change. The equipment can be adapted to various types of oil-fuelled furnaces for smelting, forging, and in the glass industry. (ERA citation 06:005018)

10B. Power Sources

AD-A094 058/5 PC **A03**/MF **A01**
Naval Coastal Systems Center, Panama City, FL.
Heat Exchanger Cleaning in Support of Ocean Thermal Energy Conversion (OTEC) - Mechanical Subsystem.
Technical memo.,
Daniel F. Lott. Dec 80, 39p Rept no. NCSC-TM-297-80
Contract ET-78-I-01-3218

This report describes the mechanical systems supporting biofouling countermeasures for Ocean Thermal Energy Conversion (OTEC). Described in the report are the water supply and distribution and the flow driven brush, recirculating sponge rubber ball, and chlorination systems. In addition, the maintenance procedures utilized at the NCSC test site are provided. (Author)

AD-A094 111/2 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Dept. of Chemistry.
N-Type Molybdenum-Diselenide-Based Liquid-Junction Solar Cells: A Nonaqueous Electrolyte System Employing the Chlorine/Chloride Couple.
Lynn F. Schneemeyer, Mark S. Wrighton, Angelica Stacy, and M. J. Sienko. 17 Dec 79, 4p
AFOSR-TR-80-1234
Grant AFOSR-80-0009
Pub. in Applied Physics Letters v36 n8 p701-703 15 Apr 80.

No abstract available.

AD-A094 216/9 PC **A04**/MF **A01**
Naval Coastal Systems Center, Panama City, FL.
Heat Exchanger Cleaning in Support of Ocean Thermal Energy Conversion (OTEC) - Electronics Subsystems.
Technical memo.,
Daniel F. Lott. Dec 80, 55p Rept no. NCSC-TM-296-80
Contract ET-78-I-01

Electronics systems supporting the development of biofouling countermeasures for Ocean Thermal Energy Conversion (OTEC) are described. Discussed are the thermistor/thermopile amplifiers, heaters, flowmeters, temperature measurement, control systems for chlorination, flow driven brushes, and recirculating sponge rubber balls. The operation and troubleshooting of each electronic subsystem is documented. (Author)

EUR-6747EN PC **A03**/MF **A01**
Commission of the European Communities, Luxembourg.
EURELIOS: The 1 MWe Experimental Solar Thermal Electric Power Plant of the European Economic Community. Summary of the Final Report on Phase B, 15 November 1977-15 November 1978.
1980, 28p
U.S. Sales Only.

The design of the planned 1-MWe tower focus power plant to be built in Sicily, Italy, is described. The heliostat array, central receiver, steam power system, and molten salt heat storage system are described. A construction time schedule is included; start-up is planned for the summar of 1980. (ERA citation 06:004670)

FE-2357-39(V.A) PC **A05**/MF **A01**
General Electric Co., Schenectady, NY. Energy Systems Programs Dept.
PFB Coal Fired Combined Cycle Development Program. Advanced Hot Gas Cleanup Concept Evaluation (Task 4.3). Volume A. Aerodyne Cyclone Evaluation.
Nov 80, 91p
Contract AC21-76ET10377

This report summarizes the results of testing of a rotary flow cyclone, manufactured by Aerodyne Development Corporation under license by Siemens Kraftwerk Union. This cyclone was selected for evaluation due to the unusually high separative efficiencies claimed by the manufacturer (based on developer data), and relative lack of open literature data. The most significant finding of this work was the observation that electrostatic forces could enhance or, in fact, dominate the separation process. Separative efficiencies, with electrostatic forces present, were found to be substantially independent of flow rate and, by inference, could be independent of unit size. This finding suggests that large cyclones with natural or augmented electrostatic forces employed in the hot gas cleanup train of the CFCC system may not suffer the performance degradation compared to small cyclones, as projected from conventional inertial theory. This is of special importance since the use of many small cyclones in parallel, or multicyclones, commonly suffers from fouling and this approach is not recommended in the CFCC application. The original objective of this investigation was to assess the relative merits of the Aerodyne cyclone separator. It was found from both the cold flow and the hot flow tests that its separative efficiencies are disappointingly poorer than expectations (in agreement with Westinghouse results), and even poorer than conventional cyclones. (ERA citation 06:004757)

PB81-134942 PC **A16**/MF **A01**
Tudor Engineering Co., San Francisco, CA.
Western States Inventory of Low-Head Hydroelectric Sites. Volume 1. Final Report and Appendix A (Site Data Listing), Appendix B (New Site Selection), Appendix C (Computer Screening).
Final rept. on Phase 2, Dec 79-Oct 80.
Oct 80, 352p
See also Volume 2, PB81-134959. Sponsored in part by Water and Power Resources Service, Denver, CO. Engineering and Research Center.

The report presents a listing of 2628 potential low-head hydroelectric sites in the 17 Western States. It includes a preliminary economic sizing and analysis using the US Corps. of Engineers National Hydropower Study Form 1 procedures.

PB81-134959 PC **A15**/MF **A01**
Tudor Engineering Co., San Francisco, CA.
Western States Inventory of Low-Head Hydroelectric Sites. Volume 2. Appendix D. Environmental Screening.
Final rept. on Phase 2, Dec 79-Oct 80.
Oct 80, 342p
See also Volume 1, PB81-134942. Sponsored in part by Water and Power Resources Service, Denver, CO. Engineering and Research Center.

The report presents a listing of 2628 potential low-head hydroelectric sites in the 17 Western States. It includes a preliminary evaluation of environmental considerations that could impact development of the sites.

PB81-145930 PC **A09**/MF **A01**
General Electric Co., Schenectady, NY.
Molten Carbonate Fuel Cell Large Stack Development.
Final rept. May 79-Jun 80,
Lawrence J. Degan. Jun 80, 195p NYSERDA-80-17

This report discusses research performed on molten carbonate fuel cell power plant development. The fuel cell promises to be a very efficient and economically and environmentally attractive way to convert the energy contained in coal to electricity. The cell could be used for base load power generation. It could also be placed in urban settings to provide locally-needed power; to stabilize voltage transients; to minimize the need for additional electric transmission lines into cities and to provide co-generated heat. This project gave specific consideration to electrode development, stack configuration, New York State applications and the applicability of New York-made gasifiers.

PB81-801458 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Combined Cycle Power Generation. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.

Dec 80, 210p
Supersedes PB80-800915, and NTIS/PS-78/1156.

Federally-funded research pertaining to design, efficiency, cost, resource requirements, and environmental aspects of combined cycle power plants is discussed. Abstracts primarily deal with use of coal gasification in conjunction with combined gas and steam turbine generation, including subsystems development studies. (This updated bibliography contains 204 citations, 53 of which are new entries to the previous edition.)

PB81-801466 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Combined Cycle Power Generation. 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 80.
Dec 80, 195p
Supersedes PB80-800923, and NTIS/PS-78/1157.

Design, performance, efficiency, economics, and environmental aspects of combined cycle power plants are discussed. Abstracts of worldwide research cover the use of waste heat from gas turbines to drive steam turbines and the thermal efficiency of integrated gasification combined cycle plants using low or intermediate Btu gas. A few abstracts pertain to control and instrumentation used in the plants. (This updated bibliography contains 234 citations, 45 of which are new entries to the previous edition.)

PB81-801730 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Solar Power Satellites. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Nov 80, 110p
Supersedes PB80-802697. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns all aspects of the development of solar power satellites. The design and construction of the satellite solar arrays and the technology of satellite solar energy conversion and transmission to earth are the major topics covered. Feasibility analyses of the solar power satellite concept are also included. (This updated bibliography contains 407 citations, 87 of which are new entries to the previous edition.)

PB81-802621 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cadmium Sulfide Solar Cells. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 300p
Supersedes PB80-802234, and NTIS/PS-78/1214.

Worldwide research on cadmium sulfide solar cell design, development, fabrication, heterojunctions, doping, and performance are cited in this bibliography. Studies on defects, protective coatings, and arrays are included. Thin films of copper indium selenide, copper sulfide, indium phosphide, cadmium selenides, and cadmium tellurides are among those described in these photovoltaic systems. (This updated bibliography contains 294 citations, 67 of which are new entries to the previous edition.)

PB81-802639 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Cadmium Sulfide Solar Cells. 1978-1980 (Citations from the NTIS Data Base).
Rept. for 1978-80.
Jan 81, 95p
Supersedes PB80-802226, and NTIS/PS-78/1213.

Citations from Federally-funded research cover cadmium sulfide solar cell theory, design, development, fabrication, and degradation. Studies include junctions with thin films of copper sulfide, selenides, and tellurides. The performance, testing, analysis, efficiency, and costs of these cells are covered. (This updated bibliography contains 90 citations, 55 of which are new entries to the previous edition.)

PB81-802829 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Sea Power Plants. 1964-November, 1979 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 79.
Jan 81, 314p
Supersedes PB80-802580, and NTIS/PS-78/1223.

Federally-funded research studies dealing with the technical and economic feasibility of solar sea power plants are discussed. Topic areas cover condenser, evaporator, and heat exchanger design; and fouling and corrosion prevention. Included are a few abstracts pertaining to site selection, dynamic modeling studies, and general studies dealing with solar sea power as an energy alternative. (This updated bibliography contains 307 citations, none of which are new entries to the previous edition.)

PB81-802837 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Sea Power Plants. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 339p
Supersedes PB80-802598, and NTIS/PS-78/1224.

The present status and future prospects of using the ocean thermal gradient for production of electric power are discussed in these citations from worldwide research. Engineering, economic, and feasibility studies are covered, including studies dealing with systems and component design. (This updated bibliography contains 332 citations, 82 of which are new entries to the previous edition.)

PB81-802845 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Solar Sea Power Plants. December, 1979-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 79-Dec 80.
Jan 81, 119p
Supersedes PB80-802580, and NTIS/PS-78/1223.

Federally-funded research studies dealing with the technical and economic feasibility of solar sea power plants are discussed. Topic areas cover condenser, evaporator, and heat exchanger design; and fouling and corrosion prevention. Included are a few abstracts pertaining to site selection, dynamic modeling studies, and general studies dealing with solar sea power as an energy alternative. (This updated bibliography contains 112 citations, all of which are new entries to the previous edition.)

PB81-856460 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Cogeneration. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 90p NERACEDBNT2675
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis of the techniques and technology for cogeneration and the effects of government policies and industrial attitudes toward cogeneration. Combined energy systems and combined manufacturing/energy systems which utilize waste heat and waste products as well as traditional fuels are included. (Contains 71 citations, fully indexed and including a table of contents.)

PB81-856478 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Ocean Thermal and Wind Power Plants and Power Generation. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Dec 80, 70p NERACIAANT2679
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and evaluation of the techniques and technology for ocean thermal energy conversion systems and small and large wind energy conversion systems. Government policies and economic incentives to commercialization worldwide are included along with considerations of economic prospects and feasibility. (Contains 65 citations, fully indexed and including a table of contents.)

PB81-856486 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Solar Power Plants. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 178p NERACUSGNT2680
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and assessment of solar power plants, solar power supplies, and solar energy systems. The techniques, technology, commercialization, and financial incentives for small-scale and large-scale, ground-based and satellite-based applications and equipment are included. (Contains 137 citations, fully indexed and including a table of contents.)

PB81-856494 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Solar Power Plants. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 194p NERACEDBNT2680
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and assessment of solar power plants, solar power supplies, and solar energy systems. The techniques, technology, commercialization, and financial incentives for small-scale and large-scale, ground-based and satellite-based applications and equipment are included. (Contains 166 citations, fully indexed and including a table of contents.)

PB81-857112 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Fossile-Fuel Power Plants and Power Generation. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 163p NERACUSGNT2690
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and comparative evaluations for utility and industry operated fossil-fuel power plants. Factors (operational, environmental, technological, etc.) influencing fossil-fuel power generation are considered. Specific geographic locations and specific power generation methods and systems are also included. (Contains 116 citations, fully indexed and including a table of contents.)

PB81-857120 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Fossil-Fuel Power Plants and Power Generation. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 195p NERACEDBNT2690

Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and comparative evaluations for utility and industry operated fossil-fuel power plants. Factors (operational, environmental, technological, etc.) influencing fossil-fuel power generation are considered. Specific geographic locations and specific power generation methods and systems are also included. (Contains 159 citations, fully indexed and including a table of contents.)

PB81-857583 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermionic Power Generation. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 139p NERACEI NT2590
Sponsored by National Technical Information Service, Springfield, VA.

Research on thermionic power generation, power plant design, converter design, and basic research on thermionic materials are cited in the bibliography. Spacecraft applications are also included. (Contains 138 citations, fully indexed and including a table of contents.)

PB81-857591 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Thermionic Power Generation. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Dec 80, 139p NERACIAANT2590
Sponsored by National Technical Information Service, Springfield, VA.

Research on thermionic power generation, power plant design, converter design, and basic research on thermionic materials are cited in the bibliography. Spacecraft applications are also included. (Contains 142 citations, fully indexed and including a table of contents.)

10C. Energy Storage

AD-A094 600/4 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Phase Change Around a Circular Pipe,
Virgil J. Lunardini. Dec 80, 26p Rept no. CRREL-80-27

No general, analytical solution exists for phase change around a cylinder, thus, approximate methods have been evaluated. The heat balance integral technique applied to the cylinder gave excellent results when compared to published numerical solutions. Graphical solutions are given for phase change about a cylinder for ranges of the Stefan number, superheat parameter, and property value ratios for typical soils. An approximate, general solution has been derived which is reasonably accurate and can be used for any values of the above-mentioned parameters. The effective thermal diffusivity method has been shown to be useful for practical problems of phase change. (Author)

PB81-801912 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silver Cells. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 158p
Supersedes PB80-802325, and NTIS/PS-78/1192.

Citations from worldwide research on silver cell primary, storage, and solid state batteries are included in this compilation. Studies on electrochemistry, electrodes, electrolytes, separators, reliability, charging, and performance are covered. The use of these batteries in spacecraft, electric automobiles, and submersibles is discussed. (This updated bibliography contains 150 citations, 26 of which are new entries to the previous edition.)

PB81-801920 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Silver Cells. 1977-1980 (Citations from the NTIS Data Base).
Rept. for 1977-80.
Jan 81, 125p
Supersedes PB80-802317, and NTIS/PS-78/1191. See also 1964-1976, PB80-802309.

The cited reports from Federally-funded research relate to silver cell primary and storage batteries with respect to electrochemistry, separators, hermetic seals, electrolytes, electrodes, charging, reliability, and application. Studies concerning silver zinc cells and silver cadmium cells are discussed in the majority of the abstracts. (This updated bibliography contains 117 citations, 12 of which are new entries to the previous edition.)

PB81-802118 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnesium Batteries. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 149p
Supersedes PB80-801392, and NTIS/PS-78/1182.

Studies on seawater batteries, dry tape batteries, storage batteries, primary batteries, and reserve batteries are cited. Design, development, electrochemistry, components, reliability, and testing are covered in this compilation of Federally-funded research. (This updated bibliography contains 142 citations, 4 of which are new entries to the previous edition.)

PB81-802126 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Magnesium Batteries. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 75p
Supersedes PB80-801400, and NTIS/PS-78/1183.

Reports from worldwide research are cited, concerning magnesium battery development, performance, and electrochemistry. The majority of studies concern seawater batteries, biomedical implants, and thermal batteries. (This updated bibliography contains 68 citations, 8 of which are new entries to the previous edition.)

11. MATERIALS

11B. Ceramics, Refractories, and Glasses

AD-A094 029/6 PC **A03**/MF **A01**
General Electric Co., Philadelphia, PA.
Improved Ceramic Heat Exchanger Materials.
Final rept.,
Harry W. Rauch, Sr., and Louis R. McCreight.
Dec 80, 40p NASA-CR-159678
Contract NAS3-19698
Sponsored in part by Interagency Agreement EC-77-A-31-1011.

Numerous compositions were developed and evaluated for potential application as heat exchanger structures in automative gas turbine engines. Test specimens in the form of small monolithic bars were evaluated for thermal expansion and dimensional stability before and after exposure to sea salt and sufuric acid, followed by short and long term cycling at temperatures up to 1200 C (2192 F). Materials which survived the screening tests were considered for fabrication into honeycomb form. The material finally selected, GE-7808, consists of the oxides, ZrO2-MgO-Al203-SiO2, and is described generically as ZrMAS. The original version on which the primary work was done was based on a commercially available cordierite (MAS) frit. Late in the program, however a clay/talc mixture was demonstrated to be a satisfactory very low cost source of the cordierite (MAS) phase.

AD-A094 324/1 PC **A04**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Compressive Strength and Damage Mechanisms in Ceramic Materials. I. Temperature-Strain Rate Dependence of Compressive Strength and Damage Mechanism in Aluminum Oxide. II. Threshold Microfracture during Elastic-Plastic Indentation of Ceramics.
Interim technical rept. 1 Feb-31 Aug 80,
James Lankford. 10 Sep 80, 57p
Contract N00014-75-C-0668
See also AD-A071 892.

The results of compression tests of Al2O3 performed over a wide range in temperature and strain rate are interpreted in terms of dominant damage mechanisms. It is shown that compressive failure in Al2O3 is caused by one of three different mechanisms, each based on tensile (Mode I) growth of predominantly axial microcracks, and each characteristic of a specific temperature-strain rate regime. The concepts developed should be applicable to other strong ceramics. In addition, indentation experiments were carried out for a variety of ceramics. It is found that the threshold for microfracture during elastic-plastic indentation corresponds to radial, rather than subsurface median, crack formation. This is contrary to the fundamental assumption of existing models for threshold crack nucleation by sharp indenters or particles; the results indicate the need to modify the stress field calculations used in these models. (Author)

AD-A094 415/7 PC **A04**/MF **A01**
SRI international, Menlo Park, CA.
High Temperature Oxidation and Mechanical properties of Silicon Nitride.
Final rept. 1 Oct 76-30-Oct 80,
D. Cubicciotti, K. H. Lau, D. J. Rowcliffe, and R. H. Lamoreaux. 30 Nov 80, 68p SRI-5522-4, AFOSR-TR-81-0031
Contract F44620-76-C-0116

A summary is presented of the progress made during the four years of an investigation into the high-temperature oxidation and mechanical properties of hot-pressed silicon nitride. Progress during the fourth year of the program is emphasized.

PB81-801722 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Silicon Nitrides. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Nov 80, 94p
Supersedes PB80-804289. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns studies of the properties of silicon nitrides. Topics covered are mechanical properties, microstructure, fracture strength, reaction kinetics, crack propagation, and high temperature tests of silicon nitrides. Applications of silicon nitrides in gas turbines and as a random material are included. (This updated bibliography contains 397 citations, 58 of which are new entries to the previous edition.)

PB81-801771 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Aluminum Oxides. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.

Dec 80, 199p
Supersedes PB80-804271. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns studies of the properties of aluminum oxides. Topics covered are mechanical properties, fracture strength, microstructure, and high temperature tests. (This updated bibliography contains 343 citations, 58 of which are new entries to the previous edition.)

PB81-802217 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Graphite--Chemical Properties. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Jan 81, 274p
Supersedes PB80-802408, and NTIS/PS-78/1053.

Research citations cover the chemistry of graphite. Studies are included on vaporization, thermodynamics, surface chemistry, intercalation compounds, chemisorption, and oxidation. (This updated bibliography contains 269 citations, 26 of which are new entries to the previous edition.)

PB81-802225 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Carbon and Graphite: Graphite--Physical, Mechanical, and Structural Studies. 1977-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1977-Dec 80.
Jan 81, 139p
Supersedes PB80-802390, and NTIS/PS-78/1052.

Research on the physical, mechanical, and structural properties of graphite are presented. Studies of graphite composites and fibers are excluded along with graphite chemistry. The majority of these studies deal with the use of graphite as a reactor material. (This updated bibliography contains 134 citations, 37 of which are new entries to the previous edition.)

11C. Coating, Colorants, and Finishes

AD-A094 044/5 PC **A05**/MF **A01**
RPJ Associates, Palos Verdes Peninsula, CA.
Review of Compliant Coating Research of M. O. Kramer.
Final rept.,
Roger P. Johnson. 17 Oct 80, 87p Rept no. RPJA-TR-0955-001
Contract N00014-80-C-0955

This technical report summarizes the 19-year history of experimental research on complaint coatings performed by Dr. Max O. Kramer. In addition to the drag reduction in the transitional flow region, the several test techniques, the various bodies of revolution, and the complaint coating designs are described in detail. (Author)

BDX-613-2512 PC **A04**/MF **A01**
Bendix Corp., Kansas City, MO.
Supplement to Report on Boron Disposition from Fused Salts. Final Report.
M. L. Smith. Oct 80, 73p
Contract AC04-76DP00613

The goal of this project was to develop a process to fabricate pure, dense, coherent boron coatings 1 mm thick on graphite or copper substrates. Electrodeposition from molten fluoride salts was the technique chosen for development. The investigation was begun by making a thorough search of the relevant literature and consulting with workers active in the field or related fields. As a result of this search, the technique selected from the literature was a process whereby boron is electrodeposited from a molten equimolal mixture of potassium and lithium fluorides containing dissolved boron trifluoride gas. Initial tests at Bendix consisted of a material evaluation study of 0.02-mm-thick, boron-coated copper specimens. The properties of the boron deposit determined from this material evaluation study were such that an apparatus was designed, constructed, and tested at Bendix Kansas City. (ERA citation 06:003941)

PAT-APPL-6-156 442 PC **A02**/MF **A01**
Department of Commerce, Washington, DC.
Ultra-Black Coating Due to Surface Morphology.
Patent Application,
Christian E. Johnson, Sr. Filed 4 Jun 80, 19p PB81-131526
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention provides a method of producing an ultra-black surface coating, having an extremely high light absorption capacity, on a substrate, such as a metal, ceramic, glass, or plastic, the blackness being associated with a unique surface morphology consisting of a dense array of microscopic pores etched into the surface, as well as the resulting coated substrate.

PATENT-4 225 372 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Surface Finishing.
Patent,
J. A. Kinzler, J. T. Hefferman, L. G. Fehrenkamp, and W. S. Lee. Filed 25 Jan 79, patented 30 Sep 80, 8p N81-14077/4, PAT-APPL-6-006 952
Supersedes PAT-APPL-6-006 952, N79-21183 (17-12, P1540).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A surface of an article adapted for relative motion with a fluid environment is finished by coating the surface with a fluid adhesive, covering the adhesive with a sheet of flexible film material under tension on the film material whereby the tensioned film material is bonded to the surface by the adhesive.

PB81-857765 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Protective Coatings for Stainless Steels. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 40p NERACASMNT2903
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations dealing with protective coatings on stainless steels exclusive of electroplating and electrodeposition. Types of protective coatings and application methods include: paints, polymeric materials, corrosion inhibitors, passivation techniques, anodization, vapor deposition and metallic and oxide films. (Contains 52 citations, fully indexed and including a table of contents.)

PB81-857773 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Protective Coatings for Nickel and Nickel Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 61p NERACASMNT2904
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations dealing with protective coatings on nickel and nickel alloys exclusive of electroplating and electrodeposition. Types of protective coatings and application methods include:paints, polymeric materials, corrosion inhibitors, passivation techniques, anodization, vapor deposition and metallic and oxide films. (Contains 81 citations, fully indexed and including a table of contents.)

PB81-857781 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Protective Coatings for Aluminum and Aluminum Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 106p NERACASMNT2905
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations dealing with protective coatings on aluminum and aluminum alloys exclusive of electroplating and electrodeposition. Types of protective coatings and application methods include: paints, polymeric materials, corrosion inhibitors, passivation techniques, anodization, vapor deposition and metallic and oxide films. (Contains 169 citations, fully indexed and including a table of contents.)

11D. Composite Materials

AD-A094 514/7 PC **A08**/MF **A01**
Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Engineering Science and Mechanics.
Nondestructive Evaluation of Damage in Metal Matrix Composites.
Final rept.,
David A. Ulman, Edmund G. Henneke, John C. Duke, Kenneth L. Reifsnider, and Wayne W. Stinchcomb. 1 Jun 80, 160p
Contract N00014-78-C-0153, ARPA Order-3388

The major purpose of this work was to develop a technical base for the application of nondestructive evaluation methods to metal matrix composites. Objectives were established: (1) To obtain base line data on non-destructive evaluation methods applied to metal matrix, fiber-reinforced composite coupon specimens with controlled, fabricated flaws; (2) To investigate ways of modifying NDE methods for application to specimens having geometries other than the flat coupon specimens; and (3) To apply appropriate NDE methods to other specimens that would be mechanically tested elsewhere. An evaluation of nondestructive techniques for determining damage in Al/FP composite materials was performed and is presented here. The nondestructive techniques examined include X-ray radiography, ultrasonic C-scan, ultrasonic attenuation, video-thermography, replication, stiffness change, eddy current and acoustic emission. To control the location of damage development notches were manufactured into several specimens. After thorough initial nondestructive characterization, the specimens were fatigued in three point bending to initiate damage. The damage in the specimens was monitored at the intermediate fatigue stages by nondestructive evaluation techniques to determine which techniques best characterize the material condition. Replication, radiography and C-scan were determined to be the best NDE techniques used for evaluation of the FP/Al composite.

PATENT-4 229 473 Not available NTIS
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Partial Interlaminar Separation System for Composites.
Patent,
W. Elber. Filed 24 Mar 78, patented 21 Oct 80, 5p N81-14000/6, PAT-APPL-889 671
Supersedes PAT-APPL-889 671-78, N78-22162 (16-13, p 1675).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

This inventor relates to an interlaminar separation system for composites wherein a thin layer of a perforated foil film is interposed between adjacent laminae of a composite formed from prepreg tapes to thereby permit laminatae adherence through the perforations and produce a composite structure having improved physical property characteristics.

11E. Fibers and Textiles

AD-A094 163/3 PC **A04**/MF **A01**
Lehigh Univ., Bethlehem, PA.
Investigations to Define Acceptability Tolerance Ranges in Various Regions of Color Space.
Final rept.,
Eugene Allen, and Barry Yuhas. Sep 80, 72p
NATICK-TR-80/036, NATICK/CEMEL-225
Contract DAAK60-78-C-0084

Current acceptance of goods for color by the Army depends on visual comparison against a standard and eight limit samples. The Army wished to have a numerical method of setting color tolerances to be used with instrumental measurement. The limit samples, on examination, were seen to be somewhat erratic as guides for instrumental tolerances. Instead, we selected pairs of samples from a large number of previous submissions by industry. These pairs showed four graduate lightness steps, four graduated chroma steps, and four graduated hue steps. Six observers looked at each pair 10 times, randomly interspersed with other pairs, and issued a pass or fail judgement each time. From these data we established lightness, chroma, and hue tolerance limits. For an olive green and a tan shade, these tolerances were roughly in the ratio 3:2:1; for a dark blue, the ratios were roughly 2:2:1. We wrote simple equations that can be used with instrumental measurement in order to determine quickly whether a sample passes or fails. We recommended similar treatment of all samples for which the Army desires acceptability limits. (Author)

PB81-801870 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fire Resistance of Fibers and Textiles. 1976-1978 (Citations from the NTIS Data Base).
Rept. for 1976-78.
Dec 80, 201p

This bibliography contains citations on the preparation and flammability of flame resistant organic fibers and textiles. Topics include new cellulosic synthetic resins, flameproofing additives, standards, and safety of the existing consumer products. (This updated bibliography contains 193 citations, 4 of which are new entries to the previous edition.)

PB81-801888 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fire Resistance of Fibers and Textiles 1977-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for 1977-Nov 79.
Jan 81, 247p

This bibliography contains worldwide citations related to the preparation and flammability of flame resistant fibers and textiles. They include flammability standards, testing, synthesis, safety factors of existing consumer products, flameproofing additives, and the durability of the product tested. (This updated bibliography contains 239 citations, none of which are new entries to the previous edition.)

PB81-801896 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fire Resistance of Fibers and Textiles. 1979-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Nov 80.
Dec 80, 65p
Supersedes PB80-801533, and NTIS/PS-78/1200. See also 1970-1972, NTIS/PS-76/0865.

The cited reports of Federally-funded research relate to the preparation and flammability of flame resistant organic fibers and textiles. Topics include new cellulosic synthetic resins, flameproofing additives, standards, and safety of the existing consumer products. (This updated bibliography contains 57 citations, 35 of which are new entries to the previous edition.)

PB81-801904 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fire Resistance of Fibers and Textiles. December, 1979-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Dec 79-Dec 80.
Jan 81, 62p
Supersedes PB80-801541, and NTIS/PS-78/1202. See also 1970-1972, NTIS/PS-76/0865, 1973-1974, NTIS/PS-76/0866, and 1975-1976, NTIS/PS-78/1201.

The cited reports from a worldwide literature survey relate to the preparation and flammability of flame resistant fibers and textiles. They include flammability standards, testing, synthesis, safety factors of existing consumer products, flameproofing additives, and the durability of the product tested. (This updated bibliography contains 54 citations, all of which are new entries to the previous edition.)

11F. Metallurgy and Metallography

AD-A094 045/2 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Corrosion Lab.
The Role of Grain Boundary Chemistry and the Environment on Intergranular Fracture.
Technical rept.,
R. M. Latanision, M. Kurkela, and F. Lee. Oct 80, 24p Rept no. TR-5
Contract N00014-78-C-0002

In this discussion the influence of grain boundary segregates and their interaction with the environment will be discussed with particular reference to hydrogen-induced intergranular embrittlement. Many of the elements which are found segregated at grain boundaries (i.e., the metalloid elements) are catalyst poisons for the hydrogen evolution reaction in electrolytes and, hence, stimulate hydrogen absorption. The use of glassy metal alloys (transition metal-metalloid type) as grain boundary analogs in studying hydrogen absorption and permeation is explored. Likewise, permeation experiments which distinguish between lattice, grain boundary and dislocation transport mechanisms will be discussed. (Author)

AD-A094 100/5 PC **A02**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Acoustic Measurements of Stress Fields and Microstructure,
G. S. Kino, D. M. Barnett, N. Grayeli, G. Herrmann, and J. B. Hunter. 23 Nov 79, 13p
AFOSR-TR-80-1225
Contract F49620-79-C-0217, Grant NSF-DMK76-00726
Pub. in Jnl. of Nondestructive Evaluation, v1 n1 p67-77 1980.

No abstract available.

AD-A094 136/9 PC **A02**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
The Low Temperature Annealing of 7.62 mm Brass Cartridge Cases: Stress Corrosion Susceptibility.
Rept. for Sep 78-Jan 80,
David S. Saunders. Jun 80, 23p Rept no. MRL-R-778

This report outlines an investigation into the effects of hardening during low temperature annealing on the stress corrosion susceptibility of brass cartridge cases. The low temperature annealing occurs in the lower walls during the mouth annealing process in the production of 7.62 mm cartridge cases. In this work cartridge cases were taken from the production line prior to the mouth anneal and then annealed in an oil bath at 200 C or 250 C for a range of times. These cases were then exposed to an ammonia environment for 4 h. The tests showed that there was no evidence of enhanced stress corrosion susceptibility at higher wall hardness resulting from the artificial low temperature annealing. The degrees of cracking in the lower walls of the cartridge cases were found to decrease with increasing times of annealing with no evidence of cracking for times in excess of 6 h at 250 C. However, the trends in the results for the cases annealed at 200 C were less obvious. Reasons for this are put forward. The hardening in the cartridge cases on low temperature annealing is explained in terms of modern theories of recovery in cold worked brasses. (Author)

AD-A094 185/6 PC **A04**/MF **A01**
TRW, Inc., Cleveland, OH. Materials Technology.
P/M Processing of Rare Earth Modified High Strength Steels.
Technical rept. 1 Oct 79-30 Sep 80,
A. A. Sheinker. Dec 80, 68p Rept no. TRW-ER-8097-2
Contract N00014-78-C-0672
See also Rept. no. TRW-ER-8097, AD-A080 637.

Material processing studies were continued directed toward developing powder metallurgy methods for producing rare earth modified high strength 4340 steel with improved resistance to hydrogen embrittlement. Three different methods of making rare earth modified 4340 steel powders were investigated: hydrogen gas atomization, mechanical alloying, and rapid solidification atomization. Hot extrusion consolidation of hydrogen gas atomized 4340 steel powders at 2150 F (1450 K) resulted in much better mechanical properties after heat treatment than hot isostatic pressing (HIP) consolidation at 2100 F (1420 K), but the ductility and impact resistance properties of the extruded powders were generally lower than those of similarly heat treated, rare earth modified, wrought 4340 steels evaluated previously, at approximately the same rare earth (cerium) content. Hot extrusion consolidation of 4340 steel powder which was mechanically alloyed with either 75% Ce-25% Ni or LaNi5 alloy powders by attriting in a special high-intensity ball mill resulted in higher strength but lower ductility and impact resistance after heat treatment than the previously evaluated wrought 4340 steels at approximately the same rare earth content. Rapid solidification atomization of 4340 steel prealloyed with cerium by adding a 75% Ce-25% Ni alloy to the melt, using both the rapid solidification rate (RSR) and commercial rapid solidification (CRS) processes, resulted in very low cerium recoveries due to vaporization of the cerium in the RSR process and oxidation of the cerium in the CRS process. Because these difficulties could not be resolved within the scope of the program, no further work was performed on rapidly solidified powders. (Author)

AD-A094 197/1 PC **A05**/MF **A01**
George Washington Univ., Washington, DC. School of Engineering and Applied Science.
Fatigue and Microstructural Properties of Quenched Ti-6Al-4V. A Crystallographic Study of Fatigue Damage in Titanium. Corrosion and Corrosion-Fatigue Behavior of Ti-4.5Al-5Mo-1.5Cr (Corona 5) and Ti-6Al-4V.
Final rept.,
C. M. Gilmore, M. A. Imam, M. Sugano, K. M. Speck, and A. C. Fraker. Sep 80, 100p Rept no. TR-5
Contract N00019-78-C-0269

The mechanical properties and microstructures of Ti-6Al-4V were determined for specimens heat treated at temperatures from 84 C to 1065 C for 10 minutes and water quenched; these properties were compared with those of alpha'-Beta annealed specimens. Specimens heat treated at 900 C and water quenched had higher fatigue lives by a factor of four to ten relative to the other treatments, in addition this treatment resulted in high ductility, yield strength, tensile strength and elastic modulus. Microstructure studies utilizing optical and transmission microscopy showed that the improved fatigue lives were a result of strain induced transformation of retained beta to alpha' martensite. Isothermal aging of as quenched specimens reduced the fatigue lives and the retained beta was thermally activated to transform to alpha' martensite. the beta to alpha' martensite transformation observed was therefore an isothermal martensite transformation whereas it is presently assumed that this transformation is always athermal. The amount of retained beta and its relative stability was shown to depend upon the heat treatment temperature.

AD-A094 271/4 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Metallurgy and Mining Engineering.

Hydrogen Effects in Nickel-Embrittlement or Enhanced Ductility.
Technical rept.,
J. Eastman, T. Matsumoto, N. Narita, F. Heubaum, and H. K. Birnbaum. Nov 80, 13p
Contract N00014-75-C-1012

In the present work we have attempted to study hydrogen-related fracture of nickel using a variety of experimental methods with the principle aim of establishing the mechanism of fracture. Fracture of nickel was studied in low pressure hydrogen gas and for specimens containing solute hydrogen using slow strain rate tension tests. both intergranular and transgranular fracture was observed on testing in hydrogen gas depending on the heat-treatment and on the pressure of trace impurities such as S, Mn, and Mg. The intergranular fracture mode was correlated with the segregation of S to the grain boundaries as measured by Auger and SIMS techniques. Specimens containing solute hydrogen fractured in an intergranular mode for all heattreatments. Detailed examination of both the intergranular and transgranular fracture surfaces indicated that neither was a truly 'brittle' fracture mode but that both indicated a high degree of local ductility. The effect of hydrogen on the plastic properties of nickel was examined using stress strain techniques and in situ deformation in an environmental cell in the HVEM. It was shown that hydrogen decreases the flow stress of nickel. In situ environmental cell fracture studies in hydrogen gas in the HVEM showed that the fracture process resulted from locally enhanced deformation at the crack tip due to the presence of hydrogen. This was confirmed by in situ fracture studies in the SEM. (Author)

AD-A094 285/4 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Application of Solidification Theory to Rapid Solidification Processing.
Semi-annual technical rept. 1 Apr-30 Sep 80,
W. J. Boettinger, J. W. Cahn, S. R. Coriell, J. R. Manning, and R. J. Schaefer. Nov 80, 14p
ARPA Order-3751

The objective of this work is to develop guidelines based on kinetic and thermodynamic solidification theory for prediction and control of rapid solidification processes. In particular, segregation effects and rules governing the formation of equilibrium and non-equilibrium phases, including metallic glasses, will be investigated. Areas where significant improvements in alloy properties can be produced by rapid solidification will be emphasized. (Author)

AD-A094 325/8 PC **A03**/MF **A01**
United Technologies Research Center, East Hartford, CT.
A Study of the Dependence of Microsegregation on Critical Solidification Parameters in Rapidly-Quenched Structures.
Annual technical rept. 1 Aug 79-30 Sep 80,
L. E. Greenwald, H. L. Fraser, M. J. Kaufman, and E. M. Breinan. Dec 80, 47p Rept no. UTRC/R80-914763-3
Contract N00014-79-C-0649

The aims of the present program were to determine both experimentally and analytically the cooling rates experienced by material during laser melting in the deep penetration and shallow penetration metling modes, to determine the microstructures and degrees of microsegregation associated with these cooling rates, to correlate the structure and segregation with weld cracking behavior, and to eventually determine the mechanism involved in weld cracking. A literature survey was performed and two new mathematical models were developed, a two dimensional model for deep penetration welding and a one dimensional model for shallow penetration surface melting. The results of both model calculations were eventually verified by experimental tests and comparisons of results, with excellent agreement being obtained for the deep penetration model and adequate agreement being obtained for the shallow penetration model. In addition a series of three special Ni-Al-Mo alloys was weld-crack tested to determine effects of microstructure on cracking behavior.

AD-A094 388/6 PC **A03**/MF **A01**
Aeronautical Research Labs., Melbourne (Australia).
Acoustic Emission from the Aluminium Alloy 7050.
Materials rept.,
S. McK. Cousland, and C. M. Scala. Oct 79, 28p Rept no. ARL/MAT-113

Studies of the acoustic emission detected during deformation of the commercial aluminum alloy 7050 are described. Tests have been performed on unflawed tensile specimens and notched specimens of the alloy in a variety of heat-treated conditions. Attempts are made to correlate the detected emission with various microstructural features affecting the deformation of the alloy. (Author)

AD-A094 390/2 PC **A03**/MF **A01**
Materials Research Labs., Ascot Vale (Australia).
High-Temperature Oxidation of Nimonic 105 at Sub-Atmospheric Oxygen Partial Pressures,
Graham R. Johnston. Oct 80, 34p Rept no. MRL-R-789

This report describes studies of some high-temperature oxidation characteristics of the wrought superalloy Nimonic 105. This work is related to the development of a high-temperature brazing process for military gas-turbine aerofoil components involving gaseous atmospheres of very low oxygen activity. (Author)

AD-A094 466/0 PC **A05**/MF **A01**
Cincinnati Univ., OH. Dept. of Aerospace Engineering and Applied Mechanics.
An Experimental Evaluation of the Mechanical Response Characteristics of Rene 95.
Interim rept. Sep 78-Apr 80,
D. C. Stouffer, L. Papernik, and H. L. Bernstein. Oct 80, 77p AFWAL-TR-80-4136
Contract F33615-78-C-5199

The mechanical responses of thermomechanically processed cast and wrought Rene 95 at 650C (1200 F) was studied. The experimental program included: tensile and compressive tests at different constant strain rates, creep in tension at and compression at twelve stress levels, strain recovery, stress relaxation, creep response to a sequence of step stress histories and fatigue under load control. The results are important for the understanding of the material response characteristics and for the development of a realistic constitutive model. Most of the tests were done in tension and data was used to evaluate various constitutive assumptions. It was shown that the engineering stress-strain response is relatively insensitive to changes in strain rate at rates above 5%/min. It was also shown that the compressive stress-strain response is about 10% stiffer than the tensile response and the minimum creep rate in compression. The hysteresis loop developed a mean tensile strain. It was found that the logarithm of the minimum creep rate is linear in the true stress and that creep and stress relaxation can be correlated using isochronous creep curves. The minimum creep rate is also independent of step changes in the stress history. (Author)

AD-A094 472/8 PC **A02**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Film Adhesion Studies with the Acoustic Microscope,
R. C. Bray, C. F. Quate, J. Calhoun, and R. Koch. 23 Apr 80, 10p GL-3178, AFOSR-TR-81-0028
Contract F49620-78-c-0098
Pub. in Thin Solid Films, v74 p295-302 1980.

No abstract available.

AD-A094 509/7 PC **A03**/MF **A01**
Stanford Univ., CA. Dept. of Materials Science and Engineering.
A Fundamental Study of the Processing of Oxide Dispersion Strengthened Metals.
Final scientific rept.,
William D. Nix. Nov 80, 39p AFOSR-TR-81-0013
Grant AFOSR-77-3128

The purpose of this research is to develop a better understanding of the structure and properties of oxide dispersion strengthened (ODS) metals. The main thrust of this work has been to understand the mechanical alloying process by which many ODS alloys are now made and to synthesize new structural materials with mechanical alloying. We are also interested in the mechanisms by which elongated grain structures form during the processing of ODS alloys. Some of our recent work has been directed toward the understanding of the high temperature mechanical properties of ODS aluminum alloys.

AD-A094 528/7 PC **A02**/MF **A01**
Illinois Inst. of Tech., Chicago. Dept. of Metallurgical and Materials Engineering.
The Mechanisms of Crack Initiation and Crack Propagation in Metal-Induced Embrittlement of Metals. Part II. Theoretical Aspects of Crack Initiation.
Technical rept. 1 Jun 79-31 Dec 80,
Paul Gordon. 15 Dec 80, 22p
Contract N00014-79-C-0580

Metal-induced embrittlement (MIE) of 4140 steel by indium has been studied using delayed failure tensile tests. The temperature and stress dependence of the kinetics of crack initiation and crack propagation in both liquid metal-induced and solid metal-induced cracking have been examined in the same system for the first time in MIE. This was done using electrical potential-drop measurements along the indium-covered portion of the sample gage length to record the start and progress of cracking, and also through fractographic observations. In Part I of the report of this work, the experimental results are presented and their implications with regard to crack propagation are discussed. In Part II, various mechanisms proposed in the literature for crack initiation are evaluated in the light of the experimental results and other known characteristics of MIE, and a new mechanism is proposed which, it is believed, synthesizes and rationalizes the available evidence best. (Author)

AD-A094 539/4 PC **A02**/MF **A01**
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
The Kinetics of Structural Relaxation of a Metallic Glass.
Technical rept.,
A. I. Taub, and F. Spaepan. 28 Apr 80, 12p Rept no. TR-10
Contract N00014-77-C-0002
Pub. in Acta Metallurgica, v28 p1781-1788 1980.

No abstract available.

AD-A094 593/1 PC **A02**/MF **A01**
Harvard Univ., Cambridge, MA. Div. of Applied Sciences.
Homogeneous Flow of Amorphous Pd77.5Cu6Si16.5.
Technical rept.,
A. I. Taub, and F. Spaepen. 28 Jul 80, 6p Rept no. TR-9
Contract N00014-77-C-0002
Pub. in Scripta Metallurgica, v14 n11 p1197-1199 1980.

No abstract available.

COO-1676-50 PC **A03**/MF **A01**
Case Western Reserve Univ., Cleveland, OH. Dept. of Metallurgy and Materials Science.
Environmental Reactions and Their Effects on Mechanical Behavior of Metallic Materials. Technical Progress Report, February 1, 1980-January 31, 1981.
R. Gibala, J. Ratka, J. Talia, and S. Wu. 31 Oct 80, 41p
Contract AC02-79ER10359

Results are described in five project areas: (1) implantation softening of niobium; (2) the crack path in hydrogen embrittlement of 4340 steel; (3) hydrogen embrittlement and stress corrosion cracking (report of a conference); (4) solution hardening and softening of niobium by interstitial solutes; (5) solution hardening and softening in oxide-coated niobium and niobium alloys. (ERA citation 06:003920)

HEDL-6878 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.

Microstructural Development for Copper Alloys Irradiated in RTNS-11.
D. G. Doran. 1979, 14p
Contract AC14-76FF02170

Microscopy and microhardness measurements were performed on pure Cu and Cu alloyed with 5% of either Al, Ni, or Mn, all irradiated in RTNS-II up to 7.5 x 10 exp 17 n/cm exp 2 . Results show that a substantial fraction of the defects are below the microscope's resolution limit and account for a large amount of the radiation hardening. The solute Al appears to lead to substantial differences in clustering of point defects within the cascade and thus affect the visibility of the clusters. The fraction of defects surviving the original cascade event is at least 9%. (ERA citation 06:003923)

PB81-135006 PC **A02**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Electrochemical Corrosion Behavior of Alloys Formed by Ion Implantation.
Rept. of investigations/1980,
B. S. Covino, Jr., B. D. Sartwell, G. R. Conner, and P. B. Needham, Jr. 1980, 25p BUMINES-RI-8431

The Bureau of Mines, U.S. Department of Interior, is conducting research to devise substitute corrosion-resistant materials by using ion implantation to form alloyed regions near the surfaces of metals. These alloys were prepared by implanting 25-kev Cr(+) and/or Ni(+) ions into iron.

PB81-135022 PC **A03**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Experimental Processing of Salt Slags from an Aluminum Dross Furnace.
Rept. of investigations/1980,
Michael J. Magyar, Robert S. Kaplan, and Harry V. Makar. 1980, 33p BUMINES-RI-8446

The Federal Bureau of Mines has developed a hydrometallurgical method to recover aluminum, aluminum oxide, and fluxing salts from aluminum salt slags. The slag is leached with water at room temperature to produce a saturated brine slurry. Screening of the slurry yields an aluminum-rich fraction that can be returned to the dross furnace. The remaining slurry is vacuum filtered, yielding a clear brine solution and an aluminum oxide filter cake. Evaporation of the clear filtrate produces a high-purity fluxing salt for reuse in the dross furnace.

PB81-135287 Not available NTIS
National Bureau of Standards, Washington, DC.
Detection and Analysis of Electrochemical Noise for Corrosion Studies,
U. Bertocci. 1979, 11p
Pub. in Proceedings of the International Conference on Metallic Corrosion (7th) Held at Rio de Janeiro, Brazil on Oct 4-11, 1978, p2010-2020 1979.

This paper describes the work done at NBS for the study of the fluctuations in current and potential of electrochemical systems, commonly referred to as electrochemical noise.

PB81-142853 Not available NTIS
National Bureau of Standards, Washington, DC.
Debris Analysis of Erosive and Abrasive Wear,
A. W. Ruff. 1980, 9p
Pub. in Proceedings of the International Conference on the Fundamentals of Tribology, Massachusetts Institute of Technology, Cambridge, MA., June 19-22, 1978, p877-885 1980.

Debris particles have been recovered from dry abrasion and erosion studies of AISI 1015 steel specimens. The size and morphology of the debris particles have been related to the worn surface topography.

PB81-143562 Not available NTIS
National Bureau of Standards, Washington, DC.
Eutectic Solidification and the Formation of Metallic Glasses,
W. J. Boettinger, F. S. Biancaniello, G. M. Kalonji, and J. W. Cahn. 1980, 6p
Sponsored in part by Defense Advanced Research Projects Agency, Arlington, VA.
Pub. in Proceedings of the International Conference on Rapid Solidification Processing: Principles and Technologies (2nd) Held at Reston, VA. on Mar 23-26, 1980, 6p 1980.

The relationship between eutectic solidification and the ease of formation of metallic glasses is investigated.

PB81-144222 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurements and Standards for Dry Wear,
A. W. Ruff. 1979, 4p
Pub. in Proceedings of National Symposium on Wear and Corrosion, Washington, DC., June 1979, 4p.

The needs for improved capability in accurately determining the wear rates of materials will be discussed. Activities currently underway to develop and provide reference materials for wear testing, to improve wear measurement procedures and to obtain meaningful wear data will be described. A comparison will be attempted in the current state-of-the-art between wear and corrosion.

PB81-144321 Not available NTIS
National Bureau of Standards, Washington, DC.
Introductory Remarks on Erosion,
A. W. Ruff. 1979, 10p
Pub. in Proceedings of NACE Conference on Corrosion/Erosion of Coal Conversion System Materials, Berkeley, CA., January 24-26, 1979, p383-392.

The status of the science of solid particle erosion of materials is reviewed briefly. Examples of recent studies of single particle and also multiple particle exposures are given. Suggestions of critical needs in the field are presented.

PB81-145542 Not available NTIS
National Bureau of Standards, Washington, DC.
Microcreep of Instrument Grade Beryllium,
R. S. Polvani, and B. W. Christ. Jul 79, 5p
Sponsored in part by Office of Naval Research, Arlington, VA.
Pub. in SAMPE Quart. 10, n4 p37-41 Jul 79.

Elevated temperature uniaxial microcreep experiments show instrument grade beryllium deforms in excess of both design limitations. However, a microstrain hardening process was observed, leading to strain exhaustion, that seems a possibility for improving microcreep strength.

PB81-148215 PC **A03**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Atmospheric Corrosion Resistance of Steels Prepared from the Magnetic Fraction of Urban Refuse.
Rept. of investigations/1980,
Stephen D. Cramer, John P. Carter, and Bernard S. Covino, Jr. 1980, 39p BUMINES-RI-8447

A study was conducted in which the magnetic fraction of urban refuse was used as melting stock in the preparation of high-strength, low-alloy and carbon steel. Product steels, made from incinerated steel can scrap, nonincinerated-detinned steel can scrap, and dilutions of these scraps with No. 1 heavy melting scrap, were used in continuing tests in industrial, rural, and marine environments to determine the effect of residual elements and atmospheric pollutants on their atmospheric corrosion resistance.

PB81-148249 PC **A02**/MF **A01**
Bureau of Mines, Rolla, MO. Rolla Research Center.
Electrolytic Reduction of Chromium (VI) and Copper Using Coke Electrodes.
Rept. of investigations/1980,
H. O. McDonald, D. M. Soboroff, and A. A. Cochran. 1980, 14p BUMINES-RI-8472

Solutions containing Cr(6+) and sulfuric acid are used in a number of surface-finishing operations. Substantial quantities of chromium and copper are lost and pollution problems are created when the spent solutions are discarded. To minimize the undesirable environmental effects while improving secondary resource recovery technology, the Bureau of Mines is conducting research to detoxify and recover metals from these solutions. Spent etchants are treated to remove copper and reduce Cr(6+) to Cr(3+) in an electrolytic cell.

PB81-801714 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Corrosion Characteristics of Aluminum Alloys. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Nov 80, 44p
Supersedes PB80-801137. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns the corrosion characteristics of aluminum alloys. Included are articles dealing with corrosion resistance, stress corrosion cracking, intergranular corrosion, electrochemical corrosion, corrosion prevention, and corrosion and fatigue tests of aluminum alloys. (This updated bibliography contains 178 citations, 16 of which are new entries to the previous edition.)

PB81-801755 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Corrosion Characteristics of Titanium Alloys. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Nov 80, 36p
Supersedes PB80-801467. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns the corrosion characteristics of titanium alloys. Included are articles dealing with corrosion resistance, electrochemical corrosion, stress corrosion cracking, and corrosion tests of titanium alloys. (This updated bibliography contains 139 citations, 13 of which are new entries to the previous edition.)

PB81-801763 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Corrosion Characteristics of Nickel Alloys. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Nov 80, 36p
Supersedes PB80-803042. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to articles from the international literature concerns the corrosion characteristics of nickel alloys. Included are articles dealing with corrosion resistance, various corrosion tests, intergranular corrosion, oxidation resistance, and stress corrosion cracking of nickel alloys. (This updated bibliography contains 129 citations, 11 of which are new entries to the previous edition.)

PB81-852782 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Corrosion of Carbon Steels. January, 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 84p NERACEI NT2176
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography cites recent research reports on carbon steel corrosion. Included are topics addressing corrosion inhibition, effect of tensile stress, metal cleaning, passivation techniques, and exposure to a wide variety of corrosive agents including hydrogen sulfide, acid solutions and chloride ion. (Contains 77 citations, fully indexed and including a table of contents.)

PB81-853152 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
High Temperature Sulfidation of Nickel and Nickel Alloys. January, 1972-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Nov 80.

Nov 80, 106p NERACIAANT2143
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography cites reports relating to high temperature corrosion of nickel and nickel base superalloys. Of particular concern is the corrosion of these metals in a sulfur containing environment in which sulfidation is the primary cause of catastrophic oxidation. The survey includes corrosion in gas turbines, high temperature fuel cells, and tungsten fiber reinforced composites. (Contains 99 citations, fully indexed and including a table of contents.)

PB81-857146 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Alloying Effects of Tungsten. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Dec 80, 165p NERACASMNT2702
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the effect of tungsten as an alloying element on a wide variety of metal alloys. Properties such as machinability, thermoelectric effects, metal strength, corrosion, creep and other physical and metallurgical aspects of alloying are discussed. No abstracts are provided prior to 1978. (Contains 233 citations, fully indexed and including a table of contents.)

PB81-857153 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnesium Alloys: Corrosion Properties. January, 1970-January, 1981 (Citations from the NTIS Data Base).
Rept. for Jan 70-Jan 81.
Jan 81, 69p NERACUSGNT2705
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the corrosion of magnesium base alloys. Particular emphasis is placed on stress corrosion cracking and fatigue strength properties. A wide variety of light metal alloys based on magnesium are covered. (Contains 58 citations, fully indexed and including a table of contents.)

PB81-857161 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Magnesium Alloys: Corrosion Properties. January, 1962-January, 1981 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 62-Jan 81.
Jan 81, 91p NERACIAANT2705
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the corrosion of magnesium base alloys. Particular emphasis is placed on stress corrosion cracking and fatigue strength properties. A wide variety of light metal alloys based on magnesium are covered. (Contains 91 citations, fully indexed and including a table of contents.)

PB81-857351 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Alloying Effects of Chromium in Nickel Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Dec 80, 74p NERACASMNT2852
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the effect of chromium as an alloying element in nickel base alloys. Properties such as machinability, thermoelectric effect, metal strength, corrosion, creep and other physical and metallurgical aspects of alloying are discussed. (Contains 88 citations, fully indexed and including a table of contents.)

PB81-857369 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Alloying Effects of Aluminum in Copper Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 59p NERACASMNT2858
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the effect of aluminum as an alloying element in copper base alloys. Properties such as machinability, thermoelectric effect, metal strength, corrosion, creep and other physical and metallurgical aspects of alloying are discussed. (Contains 70 citations, fully indexed and including a table of contents.)

PB81-857435 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Antimony Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 108p NERACASMNT2886
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the formation, composition, crystal structure, and the electrical, magnetic, and mechanical properties of antimony base alloys. The effects of composition and temperature on these properties as well as the uses of antimony base alloys are also included. (Contains 160 citations, fully indexed and including a table of contents.)

PB81-857450 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fracture Toughness. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 175p NERACUSGNT1738
Sponsored by National Technical Information Service, Springfield, VA.

Citations concerning fracture toughness testing of aluminum, cast iron, steel, various alloys, and plastic and adhesive bonded laminates are contained in this bibliography. Testing under different physical and environmental conditions is discussed. (Contains 153 citations, fully indexed and including a table of contents.)

PB81-857468 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Fracture Toughness. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 206p NERACEI NT1738
Sponsored by National Technical Information Service, Springfield, VA.

Citations concerning fracture toughness testing of aluminum, cast iron, steel, various alloys, and plastic and adhesive bonded laminates are contained in this bibliography. Testing under different physical and environmental conditions is discussed. (Contains 199 citations, fully indexed and including a table of contents.)

11H. Oils, Lubricants, and Hydraulic Fluids

PATENT-4 238 197 Not available NTIS
Department of the Air Force, Washington, DC.
Analysis of Lubricating Oils for Iron Content.
Patent,
Kent J. Eisentraut, William D. Ross, William J. Hillan, Joseph J. Brooks, and Thomas G. Duffy.
Filed 12 Apr 79, patented 9 Dec 80, 14p AD-D008 053/1, PAT-APPL-6-029 586
Supersedes PAT-APPL-6-029 586, AD-D006 039.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A method for analyzing a used lubricating oil for iron wear metal content in which all of the iron in a sample of the oil is extracted into an oil immiscible layer, buffering and reducing agents are added, and the iron in the solution is reacted with a chelating agent to forma red complex indicative of the iron content. Apparatus for carrying out the method comprises six containers, one for a lubricating oil sample and each of the other five being for a separate reagent. Also included are a reaction chamber, means for transferring oil sample and reagents from the containers to the reaction chamber which may also function as a test cell. (Author)

11I. Plastics

AD-A094 039/5 PC **A02**/MF **A01**
Northwestern Univ., Evanston, IL.
Transference Number Measurements for the Polymer Electrolyte Poly(ethylene oxide).NaSCN.
Interim technical rept.,
R. Dupon, D. H. Whitmore, and D. F. Shriver. Jan 81, 16p
Contract N00014-80-C-0532

Fmf measurements have been determined in a Na/Hg amalgam concentration cell containing the solid electrolyte poly(ethylene oxide)NaSCN. These results in conjunction with measurements made with blocking electrodes of the frequency dependent conductivity, demonstrate that the main charge carrier is Na(+). (Author)

AD-A094 467/8 PC **A03**/MF **A01**
Dayton Univ., OH. Research Inst.
Compatibility of Reticulated Foams in Typical Turbine Fuels with Currently Approved Additives.
Interim technical rept. Mar-Dec 79,
Benjamin H. Wilt. Sep 80, 32p UDR-TR-80-76, AFWAL-TR-80-4135
Contract F33615-80-C-5002

Reticulated polyester polyurethane foams have been successfully employed by the U.S. Air Force since the late 1960's in fuel tanks and dry bay areas of certain combat aircraft. Use of reticulated foams as fire and explosion retardants was initiated in 1965 when some Indianapolis 500 race cars were retrofitted with foam-filled fuel tanks to improve the crash resistance of the tanks. As a result of tests conducted for the USAF to verify the fire and explosion suppressing capability of foams, a nominal 10 pores per inch foam was produced in which all membranes in the cell structure were eliminated by thermal reticulation. During 1970 to 1972, lighter weight polyester materials were developed. These foams, which were yellow and red in color, result in a weight reduction of approximately 25 percent. The new foams also exhibited improved hydrolytic stability over the Type I orange foam which was susceptible to the combined effects of temperature and humidity. Development of a polyether polyurethane foam was initiated in 1974. The resulting dark blue and light blue foams, designated as MIL-B-83054B, Types IV and V, respectively, were intended to provide hydrolytic stability estimated to be five to ten times greater than that of the polyester materials.

AD-A094 531/1 PC **A04**/MF **A01**
Cincinnati Univ., OH. Dept. of Materials Science and Metallurgical Engineering.
Small-Angle X-Ray Diffraction Study of Thermal Transition in Styrene-Butadiene Block Copolymers.
Technical rept.,
Ryong-Joon Roe, M. Fishkis, and J. C. Chang. 15 Jan 81, 65p Rept no. TR-5
Contract N00014-77-C-0326

The small-angle X-ray scattering (SAXS) technique is used to study the transition in styrene-butadiene block copolymers from a microdomain structure to a disordered homogeneous phase. The transition, occurring on raising the temperature, is reproduc-

ible and thermally reversible. The SAXS intensity pattern, exhibiting a main interdomain peak and a few secondary peaks at room temperature, shows a gradual decrease in intensity over a temperature range of more than 100 deg, but the position and the overall shape of the main peak remain unchanged. Analysis of the SAXS data shows that, with increasing temperature, the invariant and the length of inhomogeneity decrease, but the domain boundary thickness remains approximately constant. It is concluded that the disappearance of the microdomains proceeds by gradual intermixing of components into the opposite phases, with accompanying changes in the size of the microdomains, much in the same manner as would occur with coexisting phases of a binary liquid system. Even when the microdomains have finally disappeared and the mixture has become thermodynamically homogeneous, the SAXS pattern of diminished intensity persists, reflecting the presence of dynamic density inhomogeneity, as suggested in the theories be de Gennes and by Leibler. The similarity of our SAXS results with those obtainable with a supercooled mixture undergoing a spinodal decomposition is pointed out and its thermodynamic basis discussed.

AD-A094 584/0 PC **A02**/MF **A01**
Columbia Univ., New York. Dept. of Chemistry.
An Efficient, High Conversion Photoinduced Emulsion Polymerization. Magnetic Field Effects on Polymerization Efficiency and Polymer Molecular Weight,
Nicholas J. Turro, Ming-Fea Chow, Chao-Jen Chung, and Chen-Ho Tung. 5 May 80, 5p
AFOSR-TR-81-0054
Grant AFOSR-78-3502
Pub. in Jnl. of the American Chemical Society, v102 p7391-7393 1980.

No abstract available.

INIS-mf-5510 PC **A10**/MF **A01**
Brussels Univ. (Belgium).
Relaxational Behaviour of Poly-(Vinylidene Fluoride) Before and after gamma-irradiation.
A. Callens. 204p
Thesis.
U.S. Sales Only.

Investigation of how molecular chain reorganization may affect the physical property of polymers was done by the analysis of the as received and post-irradiation relaxation spectra of the semi-crystalline linear chain polymer polyvinylidene fluoride (PVDF), which was gamma-irradiated up to doses of 1 grad. The effects of the irradiation on the material are primarily main chain cross-linking production of unsaturated bonds and crystallite degradation. To reach a complete interpretation of the relaxation spectra, it is necessary to incorporate a third phase into the analysis besides the amorphous viscoelastic region (AVR) and the crystalline viscoelastic region (CVR), the intermediate phase. The amorphous phase (AVR) is at the origin of the relaxation effects occurring in the temperature region below room temperature. The saturation like behaviour of the cross-linking in the amorphous phase is at the origin of the intensity decrease, temperature shift and peak broadening of the beta relaxation. There is a large amount of evidence that in the neighbourhood of the beta relaxation, relaxation effects are created through irradiation, as mainly revealed by TSD-spectra. The intensity of the gamma relaxation, gradually increases with dose, which has been attributed to the production of disordered chain from the debris of radiation enhanced crystallite destruction. The relaxation effect, occurring at the temperatures between AVR and CVR, is assigned to the long amorphous chain segments attached partly to the crystallites, mainly from the consideration of the similarity of the dose enhanced decrease in intensity of both beta and beta sub(mu)-effects. The increase with dose of the intensity of the alpha 1 relaxation, which has been classified within CVR, confirms the grainboundary hypothesis. The second component of CVR (alpha 2 relaxation) is due to relaxation effects of molecular chains belonging to the crystallite interior. (Atomindex citation 11:531004)

PB81-135246 Not available NTIS
National Bureau of Standards, Washington, DC.
Impregnation and Void Filling of Porous Polymer Tapes with Dielectric Oil,
A. J. Bur. 1979, 7p
Pub. in Proceedings of the Conference on Electrical Insulation and Dielectric Phenomena Held at Pocono-Hershey, White Haven, PA. on Oct 21-25, 1979, Proceedings of the 1979 Annual Report, p382-388 1979.

Porous polymer tapes are viewed as alternatives to paper tape presently used in the tape-oil insulation system of high-voltage transmission cables. The author have recently completed a study which defines the physical property criteria for porous polymer tapes and describes the experimental tests for measuring these properties. One of these tests, the degree of void filling test, was developed in the laboratory for the purpose of measuring the amount of void volume in a tape specimen which remains unfilled by the dielectric oil.

PB81-139552
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
A Conference of Thermosets--The Economic Outlook,
W. D. Bascom. 30 Jun 80, 5p
Included in European Scientific Notes, v34 n6 p282-286, 30 Jun 80.

This paper discusses thermosets versus the more popular thermoplastics. The main objective is the economic analysis for the thermosets. It also discusses some of the processing techniques.

PB81-143588 Not available NTIS
National Bureau of Standards, Washington, DC.
The Characterization of Polymers Under High Pressure Using Raman Spectroscopy,
J. F. Rabolt, S. Block, and G. J. Piermarini. 1979, 4p
Pub. in Proceedings of the AIRAPT Conference (6th) Held at the University of Colorado, Boulder, CO. on July 25-29, 1977, Paper in High-Pressure Science and Technology, Volume 1. Physical Properties and Material Synthesis, p478-481 1979.

The high pressure phase of nC20F42, polytetrafluoroethylene (PTFE) and a random copolymer of tetrafluoroethylene and hexafluoropropylene (TFE-HFP) has been investigated using Raman spectroscopy. All of these materials transform to the planar zig zag form (as evidenced by the appearance of the 625/cm band) in the 7-9 Kbar range. It was observed that the peak intensity ratio (PIR) of the 285 to 395/cm bands, taken as a qualitative measure of pressure induced deformation, increased significantly in PTFE in the 15-30 Kbar range. This behavior of the PIR with pressure was markedly different from that observed in nC20F42 and the TFE-HFP copolymer. This variation in PIR in PTFE has been correlated with a change in sample crystallinity. Morphological differences between the three materials studied suggest that the deformation mechanism at high pressures which results in an increase in PTFE crystallinity could be one of pressure induced nucleation or pressure driven crystal thickening.

PB81-144198 Not available NTIS
National Bureau of Standards, Washington, DC.
A Nondestructive Evaluation Method Using Piezoelectric Polymer Transducers and Fourier Transform Vibrational Spectroscopy,
D. H. Reneker, S. Edelman, A. Dereggi, and D. L. Vanderhart. 1979, 13p
Pub. in Proceedings of International Conference on Polymer Processing, the Massachusetts Institute of Technology, Cambridge, MA., August 1977, Paper in Science and Technology of Polymer Processing, p844-856 1979.

The normal mode vibrational spectrum of a particular object contains a wealth of information about the mechanical integrity of the object. The nondestructive evaluation of objects by observation of such vibrational spectra is facilitated by the combination of recently developed low mass, high compliance piezoelectric polymer transducers, a synchronized method for exciting the sample, and a small computer capable of making digital Fourier transforms. The sensitivity of this method to mass defects, modulus changes, and mechanical flaws in plastic objects is examined.

PB81-802738 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Plastics Used as Building or Construction Materials. 1975-January, 1981 (Citations from the Engineering Index Data Base).
Rept. for 1975-Jan 81.
Jan 81, 193p
Supersedes PB80-802804, and NTIS/PS-78/1294. See also 1970-1974, NTIS/PS-77/1163.

The cited reports from a worldwide literature survey cover the performance, structural design, strength, and fire and weather resistance of plastics for construction materials. Some applications include plumbing fixtures, molding fixtures, laminates, roofing materials, and concrete additives. (This updated bibliography contains 151 citations, 19 of which are new entries to the previous edition.)

PB81-856171 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polyvinylidene Fluoride. January, 1975-December, 1980 (Citations from the International Information Service for the Physics and Engineering Communities Data Base).
Rept. for Jan 75-Dec 80.
Dec 80, 175p NERACINSNT1922
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography from the worldwide literature, reviews polyvinylidene fluoride and other vinylidene fluoride polymers and copolymers. The references cited include chemical and electrical properties; synthesis and polymerization; film processing; and characterization. Film applications include: ultrafiltration membranes; acoustic (piezoelectric) transducers; and infrared (pyroelectric) detectors. (Contains 156 citations, fully indexed and including a table of contents.)

PB81-856189 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polyvinylidene Fluoride. December, 1973-December, 1980 (Citations from the Rubber and Plastic Research Association Data Base).
Rept. for Dec 73-Dec 80.
Jan 80, 246p NERACRPANT1922
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography, from the worldwide literature, reviews polyvinylidene fluoride and other vinylidene fluoride polymers and copolymers. The references cited include chemical and electrical properties; synthesis and polymerization; film processing; and characterization. Film applications include: ultrafiltration membranes; acoustic (piezoelectric) transducers; and infrared (pyroelectric) detectors. (Contains 299 citations, fully indexed and including a table of contents.)

PB81-856239 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polyphosphazene. December, 1973-November, 1980 (Citations from the Rubber and Plastic Research Association Data Base).
Rept. for Dec 73-Nov 80.
Dec 80, 70p NERACRPANT2217
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography reviews polyphosphazene and other phosphazene polymers and copolymers. The references cited include: physical and chemical properties; analysis and characterization; synthesis and polymerization. Applications mentioned include: fire resistant materials; thermal and electrical insulation; and biomedical materials. (Contains 72 citations, fully indexed and including a table of contents.)

PB81-857476 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Polyvinylidene Fluoride. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.

Jan 81, 68p NERACSPNNT1922
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography, from the worldwide literature, reviews polyvinylidene fluoride and other vinylidene fluoride polymers and copolymers. The references cited include chemical and electrical properties; synthesis and polymerization; film processing; and characterization. Film applications include:ultrafiltration membranes; acoustic (piezoelectric) transducers; and infrared (pyroelectric) detectors. (Contains 62 citations, fully indexed and including a table of contents.)

UCRL-52434(V.7) PC **A03**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Development of Alternate Silicone Potting Compounds. Volume 7. Development of Secondary Alternates for Dow Corning's Aerospace Sealant, DC93-120.
W. E. Cady, and A. T. Buckner. 19 Aug 80, 32p
Contract W-7405-ENG-48

A substitute for Dow Corning DC93-120 silicone potting compound can be formulated from Sylgards 184 and 186 resins and either accelerator QCF3-6559 or DC1107 fluid. Substitutes can also be formulated from Sylgard 186, dielectric gel Q3-6527, and DC1107 or from Sylgard 184, silicone dioxide, and accelerator QCF3-6559. (ERA citation 06:005110)

11J. Rubbers

AD-A094 430/6 PC **A02**/MF **A01**
Naval Undersea Research and Development Center, San Diego, CA.
Contributions of the MART Program to Math Modeling and Material Characterization of Elastomers for Transducer Application,
C. S. Nichols. Dec 71, 20p Rept no. NUC-TN-972

Under the MART Program, General Dynamics/ Electric Boat Division has conducted studies to determine the properties of rubber materials that are of interest in sonar application. These properties were used in math models to predict the behavior of these rubber materials in sonar applications such as head mount or tail mount configurations. The math models for the rubber components were used in composite math models for transducer elements.

AD-A094 513/9 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Chemistry.
NMR Study of Viscoelastic Fluids and Elastomers Under Extreme Conditions of Temperature and Pressure.
Final rept.,
Jiri Jonas. 30 Sep 80, 23p AFOSR-TR-81-0006
Grant AFOSR-77-3185

The project dealt with the investigation of the dynamic structure of three main disordered systems: (1) viscous fluids; (2) ionic mesophases of melts of alkali metal carboxylates; and (3) selected polymer systems. The results obtained carried us towards our long term goal of better understanding the relationship between the molecular behavior and the macroscopic properties of the system studied. Our experiments on fluids help to bridge the current gap between molecular dynamics and hydrodynamics. In addition, considerable effort was devoted to the development of new instrumentation necessary for NMR experiments at extreme conditions of pressure and temperature. In the case of viscous fluids, new insights have been gained concerning applicability of hydrodynamic equations at the molecular level. In the studies of alkali metal carboxylates, our research efforts have focused on the dynamic structure of the mesophase and solid of sodium isovalerate and sodium n-butyrate. Analogies existing in the Na23 NMR data between the superionic conductor, sodium beta-alumina, and solid sodium n-butyrate suggest solid sodium n-butyrate to resemble a fast ion conductor. The exploratory experiments on elastomers dealt mainly with polybutadienes investigating various dynamic properties of elastomers under extreme conditions of high temperature and high pressure.

PAT-APPL-6-202 395 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Starch Adduct Encasement of Particulate Elastomers.
Patent Application,
Baruch S. Shasha, and Thomas P. Abbott. Filed 30 Oct 80, 11p PB81-147464
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Powered and crumb rubber are prepared by dispersing in a starch alkoxide paste appropriately sized particles of wet curd from the precipitation of a latex emulsion, and then insolubilizing the paste by treatment with select bivalent cations. The result is a starch adduct encasing the particulate elastomer, thereby preventing agglomeration and congealing upon storage.

PATENT-4 238 602 Not available NTIS
Department of the Air Force, Washington, DC.
Fluorine Containing Polyethers.
Patent,
Warren R. Griffin. Filed 26 Apr 79, patented 9 Dec 80, 4p AD-D008 054/9, PAT-APPL-6-033 609
Supersedes PAT-APPL-6-033 609.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fluorinated polyether is synthesized by (1) reacting perfluoroglutaryl chloride and 1,5-hexafluoropentane diol to provide a fluorinated polyester and (2) converting ester groups of the polyester to ether groups by SF4 reduction. The product obtained is a thermally stable polyether which is particularly useful in providing an elastomeric material for aircraft fuel tank sealants, tire valves, O-rings, hose, gaskets, and the like. (Author)

PATENT-4 241 223 Not available NTIS
Department of the Air Force, Washington, DC.
F-Phenylalkylene Oxide Diacetylenes
Patent,
Keith B. Baucom. Filed 28 Aug 79, patented 23 Dec 80, 4p AD-D008 063/0, PAT-APPL-6-070 473
Supersedes PAT-APPL-6-070 473, AD-D006 763.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

F-phenylalkylene oxide acetylenes having the formula C6F5C=C(CF2OCF2)nC=CC6F5, where n ranges from 3 to 8, inclusive. The diacetylenes are useful as monomers for preparing fluorinated polyether elastomers. (Author)

PB81-134678 Not available NTIS
National Bureau of Standards, Washington, DC.
Crystallization Phenomena,
A. Peterlin. 1979, 28p
Pub. in Proceedings of the Symposium on Flow-Induced Crystallization, Midland Macromolecular Institute, Midland, MI., August 22-26, 1977, Int. Jnl. Polymer Mater. 7, p1-28 1979.

The minimum requirement of the free enthalpy increase for the formation of any type of critical size nucleus determines the probability for the nucleation from supercooled melt or solution and for the subsequent crystal growth. The minimum demand decreases as the inverse square of the supercooling. This yields a rapid increase of the nucleation and growth rate with decreasing temperature. On the other hand, the viscous resistance of the melt or solution to the chain transfer from the liquid to the crystalline phase increases with the temperature approaching that of the glass transition. Both effects together yield a maximum of the nucleation and growth rates at a finite supercooling with a subsequent drastic drop at a higher supercooling. The extension and alignment of the polymer chains in the liquid by applied mechanical forces lowers the entropy and to some extent also the enthalpy of the liquid state, thus raising the equilibrium melting temperature of the sustem and increasing the effective supercooling. As a consequence the rate of nucleation and crystal growth is drastically increased. Moreover, the shape of the primary nuclei becomes substantially linear with orientation in the main strain direction. Since these linear elements carry most of the applied load or stress the rest of the liquid can relax to such an extent that by epitaxial overgrowth the macromolecules are able to be deposited in more or less conventional lamellae perpendicular to the stress. This yields the shish-kebab structure in the stirred or sonicated solutions and the cylindritic structure in hard elastomers solidified from the extruded melt.

11L. Wood and Paper Products

AD-A094 495/9 PC **A03**/MF **A01**
Forest Products Lab., Madison, WI.
Lumber Values from Computerized Simulation of Hardwood Log Sawing.
Forest Service research paper,
D. B. Richards, W. K. Adkins, H. Hallock, and E. H. Bulgrin. Jan 80, 30p Rept no. FSRP-FPL-356

Computer simulation sawing programs were used to study the sawing of mathematical models of hardwood logs by the live sawing and three 4-sided sawing methods. One of the 4-sided methods simulated 'grade sawing' by sawing wach successive board from the log face with the highest potential grade. Logs from 10 through 28 inches in diameter were sawn. In addition, a refinement in the live sawing called live rip, in which center-sawn boards are ripped to increase value, was studied. Results generally indicate that all of the 4-sided methods studied gave similar lumber values. Live sawing was better than the 4-sided methods with good logs but inferior for 10- and 12-inch logs with large defective cores. Live sawing followed by ripping produced the highest lumber values in almost all cases. (Author)

PATENT-4 209 561 Not available NTIS
National Aeronautics and Space Administration, Moffett Field, CA. Ames Research Center.
Structural Wood Panels with Improved Fire Resistance.
Patent,
P. M. Sawko. Filed 28 Jul 78, patented 24 Jun 80, 4p N81-13999/0, PAT-APPL-929 086
Supersedes PAT-APPL-929 086-78, N78-28178 (16-19, p 2498).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Structural wood paneling or other molded wood compositions consisting of finely divided wood chips, flour, or strands are bound together and hot pressed with a modified novolac resin which is the cured product of a prepolymer made from an aralkyl ether or halide with a phenol and a hardening agent such as hexamethylene tetramine. The fire resistance of these articles is further improved by incorporating in the binder certain inorganic fillers, especially a mixture of ammonium oxalate and ammonium phosphate.

12.

MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A094 055/1 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Recent Results Concerning the Effects of Nonlinearities on Random Inputs,
Gary L. Wise. 1980, 6p AFOSR-TR-80-1305
Grant AFOSR-76-3062
Presented at the Southeastern Symposium on System Theory (12th), p290-294, 19-20 May 80.

No abstract available.

AD-A094 056/9 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
On the Determination of Regression Functions,
Gary L. Wise, and Neal C. Gallagher, Jr. 1979, 9p AFOSR-TR-80-1306
Grant AFOSR-76-3062
Presented at the Annual Allerton Conference on Communication, Control and Computing (17th) p616-623, 10-12 Oct 79. Prepared in cooperation with Purdue Univ., Lafayette, IN. School of Electrical Engineering.

No abstract available.

AD-A094 057/7 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Electrical Engineering.
Stochastic Convergence under Nonlinear Transformations on Metric Spaces,
Gary L. Wise, and H. Vincent Poor. 1979, 6p AFOSR-TR-80-1307
Grant AFOSR-76-3062
Presented at the Conference on Information Sciences and Systems, p431-435, 26-28 Mar 80. Prepared in cooperation with Illinois Univ. at Urbana-Champaign. Coordinated Science Lab.

No abstract available.

AD-A094 059/3 Not available NTIS
New York Univ., NY. Courant Inst. of Mathematical Sciences.
Free Vibrations for a Nonlinear Wave Equation and a Theorem of P. Rabinowitz,
Haim Brezis, Jean-Michel Coron, and Louis Nirenberg. Apr 80, 19p ARO-15779.5-M
Grants DAAG29-78-G-0127, NSF-MCS79-00813
Availability: Pub. in Communications on Pure and Applied Mathematics, v33 p667-689 1980 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 066/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Some Remarks on the Gaussian Discriminant.
Technical note,
Lee K. Jones. 3 Oct 80, 15p TN-1980-47, ESD-TR-80-193
Contract F19628-80-C-0002

We comment on the performance of the Gaussian discriminant function with (possibly) non-Gaussian underlying distributions. An asymptotic expression for the probability of error for the Gaussian case is given with a formal convergence proof. (Author)

AD-A094 093/2 PC **A02**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Mathematics.
The Fuzzy Integral,
Dan A. Ralescu, and Gregory Adams. 1980, 10p AFOSR-TR-80-1301
Grant AFOSR-76-2927
Pub. in Jnl. of Mathematical Analysis and Applications, v75 n2 p562-570 Jun 80.

No abstract available.

AD-A094 099/9 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Mathematics.
Investigation of a Class of Systems of Integral Equations,
A. G. Ramm. 1980, 12p AFOSR-TR-80-1057
Contract F49620-79-C-0128
Pub. in Jnl. of Mathematical Analysis and Applications, v76 n2 p303 Aug 80.

No abstract available.

AD-A094 140/1 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Mathematics.
Perturbations Preserving Asymptotic of Spectrum,
A. G. Ramm. 1980, 15p AFOSR-TR-80-1060
Contract F49628-79-C-0128
Pub. in Jnl. of Mathematical Analysis and Applications, v76 n1 p1-13 Jul 80.

No abstract available.

AD-A094 143/5 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Evaluating the Validation of a Monte Carlo Simulation of Binary Time Series.
Final rept.,
Diego R. Roque. 19 Sep 80, 32p Rept no. NRL-8427

A statistical technique has been developed for the validation of a Monte Carlo simulation process or other processes whose results can be reduced to a finite time sequence of equally spaced events with dichotomous outcomes. Essential to the technique is the Bahadur-Lazarsfeld representation of the probability distribution of the populations consisting of all binary vectors with a specific number of elements. This paper analyzes the properties of the test and the adequacy of the Bahadur-Lazarsfeld representation for practical application purposes. It examines the probability of rejection which results when the significance level alpha is specified and computes the power of the test when the null hypothesis is tested against known alternatives. The evidence collected suggests that the statistical test is an adequate tool for the purposes for which it was designed. (Author)

AD-A094 228/4 PC **A05**/MF **A01**
Kentucky Univ., Lexington. Dept. of Electrical Engineering.
Some Numerical Methods for Exponential Analysis with Connection to a General Identification Scheme for Linear Processes.
Technical rept. 15 May 78-15 Feb 80,
Jon R. Auton, and L. Wilson Pearson. Nov 80, 77p Rept no. RR-80-5
Contract N00014-77-C-0362

A general identification scheme for linear processes is presented and related to some well-known exponential analysis methods such as Prony's method and the pencil-of-functions method. An elucidating explanation of the source of error (bias) for the general scheme is given. Some variations of the pencil-of-functions method are given an intense examination with some revealing numerical examples. A new exponential analysis method, called the adaptive method, is developed from the general scheme. Numerical examples of the adaptive method demonstrate its excellent performance in the presence at high levels of noise. Recommendations are made concerning the use of the adaptive method and directions for further work. (Author)

AD-A094 232/6 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
A New Method for Solving Linear Inequalities.
Technical rept.,
G. W. Stewart. Nov 80, 12p Rept no. TR-970
Contract N00014-76-C-0391

This paper describes a new method for finding nontrivial solutions of the inequality $Ax > or = 0$, where A is an mxn matrix of rank n. The method is based on the observation that a certain function f has a unique minimum if and only if the inequality fails to have a nontrivial solution. Moreover, if there is a solution, the direction of divergence of an attempt to minimize f will converge to a solution. The technique can also be used to solve inhomogeneous inequalities and hence linear programming problems, although no claims are made about competitiveness with existing methods.

AD-A094 235/9 PC **A03**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Management Sciences Research Group.
Approaches for Convergence of a Basic Iterative Method for the Linear Complementarity Problem.
Management sciences research rept.,
Jong-Shi Pang. Nov 80, 35p Rept nos. MSRR-466, WP-24-80-81
Contract N00014-75-C-0621, Grant NSF-ECS79-26320

Iterative methods have been found very useful for solving many large linear complementarity problems arising from applications. In this paper, we formulate a basic algorithm and use it as a unifying framework for the study of such methods. Next, we apply various strategies to investigate the convergence of the basic algorithm. Finally, we discuss the possibility of extending the analysis presented here to treat other complementarity and variational problems. (Author)

AD-A094 257/3 PC **A02**/MF **A01**
Maryland Univ., College Park. Dept. of Computer Science.
Constrained Definite Hessians Tend to be Well Conditioned.
Technical rept.,
G. W. Stewart. Jun 80, 11p Rept no. TR-908
Contract N00014-76-C-0391

The testing of optimization algorithms requires the running of problems with ill-conditioned Hessians. For constrained problems, it is the projection of the Hessian onto the space determined by the active constraints that must be ill conditioned. In this note it is argued that unless the Hessian and the constraints are constructed together, the constrained Hessian is likely to be well conditioned. The approach is to examine the effects of random constraints on a singular Hessian. (Author)

AD-A094 315/9 PC **A03**/MF **A01**
Texas A and M Univ., College Station. Inst. of Statistics.
Time Series Model Identification and Prediction Variance Horizon.
Technical rept.,
Emanuel Parzen. Jun 80, 35p Rept no. TR-N-13
Contract N00014-78-C-0599

An approach to time series modelling is described; it classifies the time into one of three memory types (called no memory, short memory, and long memory), and then finds a whitening filter. When the time series is short memory one would like to identify the whitening filter type as AR, MA, or ARMA before parameter estimation. A new tool is introduced which can be used to diagnose both the memory type of a time series, and the whitening filter type of a short memory time series. It is called prediction variance horizon function. To classify the model type of a time series, one uses the shape of PVH and the value of the horizon HOR (defined as the smallest value of h for which PVH(h) less than or = 0.05). The analysis of a real time series, called Freeze, is described.

AD-A094 385/2 PC **A06**/MF **A01**
SRI International, Menlo Park, CA. Computer Science Lab.
Metafunctions: Proving Them Correct and Using Them Efficiently as New Proof Procedures.
Technical rept.,
Robert S. Boyer, and J. Strother Moore. Dec 79, 115p Rept no. SRI/CSL-108
Contract N00014-75-C-0816, Grant NSF-MCS79-04081

We describe a sound method for permitting the users of a mechanical theorem-proving system to add executable code to the system, thereby implementing a new proof strategy and modifying the behavior of the system. The new code is mechanically derived from a function definition conceived by the user but proved correct by the system before the new code is added. We present a simple formal method for stating within the theory of the system the correctness of such functions. The method avoids the complexity of embedding the rules of inference of the logic in the logic. Instead, we define a meaning function that maps from objects denoting expressions to the values of those expressions under a given assignment. We demonstrate that if the statement of correctness for a given 'metafunction' is proved, then the code

derived from that function's definition can be used as a new proof procedure. We explain how we have implemented the technique so that the actual application of a metafunction is as efficient as hand-coded procedures in the implementation language. We prove the correctness of our implementation. We discuss a useful metafunction that our system has proved correct and now uses routinely. We discuss the main obstacle to the introduction of metafunctions: proving them correct by machine. (Author)

AD-A094 409/0 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Inst. of Statistics.
Time Series Forecasting by ARARMA Models.
Technical rept.,
Emanuel Parzen. Jun 80, 25p Rept no. TR-N-14
Contract N00014-78-C-0599

The relation between various basic problems of time series analysis is presented. Exponential smoothing methods are developed from the point of view prediction theory and extended. ARARMA models are introduced. Methods of ARARMA model fitting are outlined. Since 'the proof of the pudding is in the eating,' the methods proposed are illustrated using some classic examples of time series, including international airline passengers, Makridakis metals series and sunspots.

AD-A094 463/7 PC **A02**/MF **A01**
Texas Univ. at Austin. Dept. of Physics.
Time-Dependent Hartree-Fock Formalism for the Dielectric Function,
N. E. Brener, and J. L. Fry. 24 Jul 78, 9p
AFOSR-TR-81-0070
Grant AFOSR-76-2981
Pub. in Physical Review B, v19 n4 p1720-1726, 15 Feb 79.

No abstract available.

AD-A094 574/1 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Reduced Order Models Via Continued Fractions Applied to Control Systems,
William Porras. Sep 80, 95p

Based on the theory of continued fractions, a technique is developed for the reduction of high order multivariable systems. The mathematical basis for which these techniques work is elucidated, and its superiority of the mixed form over any other form of continued fractions is established. The general solution to linear regulator problem is developed and the properties which this solution exhibit are elucidated. (Author)

AD-A094 577/4 PC **A02**/MF **A01**
Georgia Tech Research Inst., Atlanta.
Optimum Designs for Second Order Processes with General Linear Means.
Final rept.,
Marcus Carlton Spruill, III. 18 Nov 80, 4p
AFOSR-TR-80-1280
Contract F49620-79-C-0122

In the experimentation of any of the sciences, physical, biological, or social there arise situations in which the exact conduct of a specified experiment is under the control of an experimenter. The experimenter must therefore make a decision. Where the conduct of an individual experiment may be costly or where there are a large number of possible experiments a premium is placed upon the quality of this decision. This research was concerned with the selection of the proper experiments when the data are 'time' recordings. Of special interest was data which arise as solutions to linear white noise random differential equations. Approximately optimal designs were effectively characterized for this case. Similar characterizations were shown to hold for partial differential operators and random fields. Work was also begun on the identification of experiments which are robust against departures from the assumed model. Results were obtained for both scalar and 'time' recording data. (Author)

AD-A094 579/0 PC **A03**/MF **A01**
Arizona Univ., Tucson. Dept. of Mathematics.
Decoupling and Order Reduction for Linear Time-Varying Two-Time-Scale Systems.
Technical rept.,
Robert E. O'Malley, Jr., and Leonard R. Anderson. Jul 80, 32p Rept no. TR-27-1
Contract N00014-76-C-0326
Prepared in cooperation with Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.

The class of time-varying linear systems which are two-time-scale on an interval may be decoupled by a time-varying transformation of variables into separate subsystems containing the slow and fast dynamic parts. The transformation is obtained by solving a nonsymmetric Riccati differential equation forward in time and a linear matrix differential equation backward in time. Small parameters are identified which measure the strength of the time scale separation and the stability of the fast subsystem. As these parameters go to zero, the order of the system is reduced and a useful approximate solution to the original system is obtained. The transformation is illustrated for examples with strong and weak fast subsystem stability. (Author)

AD-A094 536/5 PC **A03**/MF **A01**
Washington Univ., Seattle. Dept. of Aeronautics and Astronautics.
Passage through Resonance,
Jerry Kevorkian. 1980, 34p
Contract F49620-79-C-0141
Pub. in Singular Perturbations and Asymptotics, p191-222 1980.

No abstract available.

AD-A094 613/7 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Truncation and Acceptance Rules for Sequential Tests for A Bernoulli Parameter.
Master's thesis,
Juergen Petersen. Sep 80, 129p

In the paper, Wald's Sequential Probability Ratio test for a Bernoulli parameter is studied to assess the influence of truncation on the tree probabilities of error of the first and second kind. It is shown that a natural truncation point exists for every SPR test such that the desired error probabilities are not exceeded. Extended acceptance rules were described whose use allows truncation comparatively early when certain sample sizes are picked. The true error probabilities achieved are either both smaller or equal to the desired ones or one is smaller or equal and the other is exceeded. In the latter case, that probability of error that shall not be exceeded can be chosen and the other will be as small as possible. A listing of 126 SPR plans useful in quality control applications has been included which gives all described truncation points with the applicable acceptance rules and the values for the true probabilities of error. (Author)

PB81-137176 Not available NTIS
National Bureau of Standards, Washington, DC.
Whittaker Functions with Both Parameters Large: Uniform Approximations in Terms of Parabolic Cylinder Functions,
F. W. J. Olver. 1980, 21p
Contract DAAG29-77-G-0003, Grant NSF-MCS78-02111
Pub. in Proceedings of the Royal Society of Edinburgh 86A, p213-234 1980.

Asymptotic approximations are derived for the Whittaker functions (W sub kappa, mu)(z), (M sub kappa, mu)(z), (W sub i(kappa), i(mu))(iz) and (M sub i(kappa), i(mu))(iz) for large positive values of the parameter mu that are uniform with respect to unrestricted values of the argument z in the open interval (0,infinity), and bounded real values of the ratio kappa/mu. The approximations are in terms of parabolic cylinder functions, and in most instances are accompanied by strict error bounds. The results are derived by application of a recently-developed asymptotic theory of second-order differential equations having coalescing turning points, and an extension of the general theory of equations of this kind is also included.

PB81-144214 Not available NTIS
National Bureau of Standards, Washington, DC.
Comment on Explicit Integration Method for the Time-Dependent Schrodinger Equation,
R. J. Rubin. May 79, 1p
Pub. in Jnl. Chemical Physics 70, n10 p4811, 15 May 79.

Recently, A. Askar and A. S. Cakmak outlined a numerical method for explicit integration of the time-dependent Schrodinger equation which they believed was new and unconditionally stable. In fact, it is neither. In 1957, their method was proposed and shown to be conditionally stable (in one space dimension) by H. F. Harmuth (H). In 1959, a slightly different explicit numerical integration method was analyzed for stability and used by J. Mazur and R. J. Rubin (MR) for the time-dependent Schrodinger equation in two dimensions. The MR algorithm is also conditionally stable. The stability condition is identical with that for the H algorithm.

PB81-856692 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Computerized Two-Dimensional Finite Element Analysis. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Dec 80, 60p NERACIAANT2689
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning computerized simulation and design and computer programs and calculations related to finite element analysis of two-dimensional fluid flow and to finite element structural and stress analysis of two-dimensional bodies. (Contains 51 citations, fully indexed and including a table of contents.)

12B. Operations Research

AD-A094 190/6 PC **A04**/MF **A01**
Carnegie-Mellon Univ., Pittsburgh, PA. Management Sciences Research Group.
Linearizing Nonlinear 0-1 Programs.
Management sciences research rept.,
Egon Balas, and Joseph B. Mazzola. Oct 80, 65p Rept nos. MSRR-467, WP-20-80-81
Contract N00014-75-C-0621, Grant NSF-ECS79-02506

Any real-valued nonlinear function in 0-1 variables can be rewritten as a multilinear function. We discuss classes of lower and upper bounding linear expressions for multilinear functions in 0-1 variables. For any multilinear inequality in 0-1 variables, we define an equivalent family of linear inequalities. This family contains the set of generalized covering inequalities defined by Granot and Hammer. Several results concerning the relative strengths of inequalities within this family are presented. An algorithm for the general multilinear 0-1 program is given, and computational experience with the algorithm applied to randomly generated problems is discussed. The use of the general procedure as an effective heuristic for multilinear 0-1 programs is also demonstrated. (Author)

AD-A094 313/4 PC **A03**/MF **A01**
George Washington Univ., Washington, DC. Program in Logistics.
On the Ample Service Assumption of Palm's Theorem in Inventory Modeling.
Scientific rept.,
Donald Gross. 3 Oct 80, 44p Rept no. SERIAL-t-433
Contract N00014-75-C-0729

A key assumption of much of the continuous review inventory modeling work is that orders placed do not queue up, so that there is complete order crossing and hence order lead times are strictly independent random variables. This paper investigates the effects of this assumption (which is almost never true). (Author)

AD-A094 411/6 PC **A05**/MF **A01**
Texas A and M Univ., College Station. Telecommunication and Control Systems Lab.
Nonlinear Model Identification from Operating Records.
Final rept. Jun-Dec 79,
Bruce K. Colburn, and Alvin R. Schatte. Nov 80, 96p TCSL-80-01, AFOSR-TR-81-0076

Contract F49620-79-C-0091

Two basic response error (RE) model-reference adaptive system (MRAS) identifiers are derived for nonlinear model identification without advance knowledge of the nonlinearities. The methods are developed and shown to be applicable for systems with input and output measurement noise. Design consideration, comparison of linear and nonlinear model fits to a nonlinear plant are given. The applicability of such an approach for the human operator model are discussed. (Author)

PB81-139602 (Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Operations Research in Italy--Part Two,
R. E. Machol. 30 Jun 80, 5p
Included in European Scientific Notes, v34 n6 p296-300, 30 Jun 80.

The article discusses studies of operations research at the Universities in Pisa, Florence, Padua, Trieste, and Milan.

13.

MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A094 201/1 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Superhigh-Pressure Mercury Lamps of the Type DRSh TU 16-535.281-69.
5 Dec 80, 8p Rept no. FTD-ID(RS)T-1622-80
Edited trans. of Lampy Rtutnyye Sverkhvysokogo Davleniya Tipa DRSh TU 16-535.281-69 (USSR) p1-4 1970, by Victor Mesenzerff.

No abstract available.

AD-A094 229/2 PC **A05**/MF **A01**
Johns-Manville Sales Corp., Denver, CO. Research and Development Center.
Performance Evaluation of Steam Traps and Orifice Plates.
Final rept. 1 Oct 79-1 Oct 80,
Philip B. Shepherd. Oct 80, 90p USAFESA-TS-2085
Contract DAAK70-78-D-0002

Steam traps and orifice plates have been examined to assess their utility as condensate control devices in typical Army steam systems. Specific types of devices have been recommended for the various major user in Army facilities. Selection of the size of each device should be made in accordance with manufacturers recommendations. Inspection and maintenance of steam devices is critical to their proper operation and to energy conservation. Industrial maintenance firms may perform this function in cases where there are insufficient Facilities Engineering personnel to provide periodic inspections. (Author)

AD-A094 290/4 PC **A05**/MF **A01**
Colorado Univ. at Boulder. Dept. of Mechanical Engineering.
Effective Techniques for Augmenting Heat Transfer: An Application of Entropy Generation Minimization Principles.
Final rept. 1 Oct 78-30 Sep 80,
Adrian Bejan. Dec 80, 83p Rept no. CUMER-80-9
Contract N00014-79-C-0006

The techniques for heat transfer augmentation play an important role in the development of efficient and inexpensive equipment for heat exchange processes. In the present study, the effectiveness of a given augmentation technique was determined based on the amount of irreversibility (waste of useful energy) introduced by the technique into the heat exchanger where it is to be used. This report summarizes the main results obtained during the past two years under research contract N00014-79-C-0006 at the University of Colorado. The report is organized into three distinct parts. The first part contains a fundamental investigation of the entropy generation mechanism in elementary heat transfer configurations. The second part describes in quantitative terms the irreversibility minimization potential of some of the most common augmentation techniques, namely, swirl-flow devices and roughened surfaces. The final part considers the entropy generation penalty associated with the use of extended surfaces (fins) in convective heat transfer. This part shows how the fin geometry may be selected so that the fin performs its prescribed heat transfer duty with minimum generation of entropy. (Author)

NE/HETV-80/9 PC **A03**/MF **A01**
Viak AB, Vallingby (Sweden).
Energy out of Groundwater.
T. Agerstrand, and L. O. Eriksson. Mar 80, 42p
In Swedish.

The purpose of this inventory is to estimate those energy resources of the built-up area which are stored in aquifers with good tapping facilities. It is presumed that the energy is extracted by conventional heat pump technique in a relatively big scale. Following conditions have to be met: (1) adequate access to ground water having ample and stable temperature, (2) facilities to exploit the ground water at a lower temperature, (3) a well built-up residential area, and (4) access to reasonably priced momentum power for the heat pump. The inventory is based on the following assumptions: (1) the potential tapping points have been localized with the support of earlier investigations and by the appraisement of the hydrogeological experts of VIAK; (2) the temperature of the ground water at the depth of 10 m must be higher than 4.5 exp 0 C, which excludes the provinces of Jaemtland, Vaesterbotten and Norrbotten; (3) the capacities of tapping more than 100 1/sec and between 25 and 100 1/sec have been stated paying regard to the sizes of the built-up areas; and (4) the calculated effects are based upon 60 exp 0 C as the condensation temperature of the heat pump and the lowering of the temperature to +1 exp 0 C. The total power requirement per tenement will be 5. kW. Thus approx. 295,000 tenements in build-up areas can be supplied with heat to 90% of their yearly requirement by means of energy from ground water and the heat pump. Conflict of interests reduce the coverage to approx. 184,000 tenements which means approx. 9% of the total number. (ERA citation 06:004987)

PATENT-4 218 892 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Low Cost Cryostat.
Patent,
J. B. Stephens. Filed 29 Mar 79, patented 26 Aug 80, 9p N81-14287/9, PAT-APPL-6-025 162
Supersedes PAT-APPL-6-025 162, N79-20283 (17-11, p 1417). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A cryostat for use in a low or a substantially gravity-free environment adapted to cool an experiment through the use of helium 2, or helium in its super fluid state is characterized by a number of interchangeable daughter dewars and helium supply or mother dewar. A low pressure venting system is provided for converting helium contained in the mother dewar to a superfluid state for use as a primary cryogen. Each daughter dewar is adapted to be removably mounted in mated relation on the mother dewar and is characterized by support for an experiment package, a source of helium to be employed as a secondary cryogen. A heat pipe is suspended from each daughter dewar and adapted to be extended into the mother dewar for facilitating cooling of the secondary cryogen. A transfer of heat from the package to the primary cryogen, via the secondary cryogen, is accommodated as a film flow of helium 2 progresses from the heat pipe to the experiment dewar.

PATENT-4 235 060 Not available NTIS
National Aeronautics and Space Administration, Houston, TX. Lyndon B. Johnson Space Center.
Installing Fiber Insulation.
Patent,
D. S. Wang, and A. D. Warren. Filed 15 Dec 78, patented 25 Nov 80, 4p N81-14317/4, PAT-APPL-969 756
Supersedes PAT-APPL-969 756-78, N79-17224 (17-08, p 0988). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method for installing fragile, high temperature insulation batting in an elongated cavity or in a resilient wire sleeve to form a resilient seal. The batting is preformed to rough dimensions and wrapped in a plastic film, the film being of a material which is fugitive at a high temperature. The film is heat sealed and trimmed to form a snugly fit skin which overlaps at least at one end to permit attachment of a pull cord. The film absorbs the tensile force of pulling the film enclosed batting through the cavity or wire mesh sleeve and is subsequently driven off by high temperature baking, leaving only the insulation in the cavity or wire mesh sleeve.

PB81-145450 Not available NTIS
National Bureau of Standards, Washington, DC.
Determination of Thermal Performance Characteristics of Modular Passive Solar Storage Walls.
Final rept.,
W. Kennish, and M. McCabe. Oct 80, 5p
Pub. in Proceedings of the American Society of the International Solar Energy Society and National Passive Solar Conference Annual Tech. Conference Passive Systems Div. (5th), University of Massachusetts, Amherst, October 19-26, 1980, p975-979 Oct 80.

A conceptual study of testing procedures to determine thermal performance characteristics of Trombe-wall-type passive solar storage wall systems has been performed in the study, a finite-difference thermal model of a passive solar storage wall in a test facility was used to predict the wall thermal performance in a particular climatic location. The simulated test results were used in a multiple regression analysis to characterize the thermal performance of a test wall. These characteristics were then used in a simplified calculation procedure to predict the thermal performance of the solar storage wall in different climatic regions.

PB81-145567 Not available NTIS
National Bureau of Standards, Washington, DC.
Evaluation of Proposed Modification to F Chart to Include Collector Array Air Leakage.
Ronald L. Overton, David E. Cassel, and Michael E. McCabe. 1980, 10p
Sponsored in part by Department of Housing and Urban Development, Washington, DC.
Pub. in Proceedings of the Winter Annual Meeting Solar Energy Division, American Society of Mechanical Engineers, Chicago, IL., November 16-21, 1980, Paper 80 WA/Sol-12, p1-10 1980.

Field measurements of air leakage reported for a number of residential and commercial solar air heating systems suggests that air leakage occurs in most collector arrays. However, standard analytical techniques to predict solar energy system performance such as the f-chart method do not consider the effects of air leakage on system thermal performance. A proposed method for incorporating collector array leakage considerations into the f-chart method of system evaluation was determined to be effective.

PB81-145823 PC **E05**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Fire Safety of Wood-Burning Appliances, Part 1: State of the Art Review and Fire Tests, Volume 1 and Volume 2.
Final rept.,
Richard D. Peacock, Efrain Ruiz, and Roberto Torres-Pereira. Nov 80, 80p NBSIR-80-2140
Sponsored in part by Department of Energy, Washington, DC. Part 1, Volume 2, is in microfiche form in the back of Part 1, Volume 1. It consists of 6 MF inserts 48X reduction.

A series of 18 full-scale tests was conducted in an instrumented test room using five different wood-burning appliances. These tests were designed (1) to establish typical operating conditions including temperatures on the appliances, chimneys, and adjacent combustible surfaces; (2) to study the effects of a variety of combinations of appliance design, clearance to combustibles, and room construction on temperatures on adjacent combustible surfaces; and (3) to compare these measured values with theoretical predictions of wall surface temperature. Additional tests were conducted to compare a standardized fuel source with typical oak logs. A review of literature related to wood-heating safety included in this study revealed that current codes are based on data almost 40 years old. The results of these tests point out some areas where the codes should be modernized to accurately reflect the newer appliances and construction techniques.

PB81-149825 Not available NTIS
National Bureau of Standards, Washington, DC.
Development of Thermal Performance Criteria for Residential Passive Solar Buildings.
Final rept.,
P. A. Sabatiuk, and M. McCabe. Oct 80, 4p
Pub. in Proceedings of the American Society of the International Solar Energy Society and National Passive Solar Conference Annual Tech. Conference Passive Systems Div. (5th), University of Massachusetts, Amherst, October 19-26, 1980, p621-624 Oct 80.

In support of the development of thermal performance criteria for residential passive solar buildings, thermal design characteristics and anticipated performance for 266 projects in the HUD Passive Residential Design Competition and the HUD Cycle 5 Demonstration Program were analyzed. A number of performance measures were examined, including net solar contribution, solar fraction, and auxiliary energy use. These and other design and climate-related parameters were statistically correlated using the DATAPLOT computer program and standard statistical analysis techniques.

PB81-149858 Not available NTIS
National Bureau of Standards, Washington, DC.
Review of Thermal Performance Test Procedures for Testing Passive/Hybrid Solar Components.
Final rept.,
W. Ducas, M. McCabe, and K. DeCorte. Oct 80, 5p
Pub. in Proceedings of the American Society of the International Solar Energy Society and National Passive Solar Conference Annual Tech. Conference Passive Systems Div. (5th), University of Massachusetts, Amherst, October 19-26, 1980, p970-974 Oct 80.

Existing test methods have been reviewed for their application as thermal performance test procedures for modular passive/hybrid solar components. These methods cover the thermal performance of building envelope assemblies such as walls and windows, and tests developed for thermal storage assemblies. A classification of passive components is identified, recommendations are made for testing several types of passive components, and recommendations for new test procedures are identified.

PB81-149866 Not available NTIS
National Bureau of Standards, Washington, DC.
Performance Evaluation of Passive/Hybrid Solar Heating and Cooling.
Final rept.,
M. McKinstry, T. Richtmyer, and W. Ducas. Oct 80, 5p
Pub. in Proceedings of the American Society of the International Solar Energy Society and National Passive Solar Conference Annual Tech. Conference Passive Systems Div. (5th), University of Massachusetts, Amherst, October 19-26, 1980, p346-350 Oct 80.

Two levels of passive/hybrid solar heating and cooling performance evaluation are discussed. Both levels use a subtractive calculation for passive heating or cooling used by the building, although, with the more detailed method, heat flux to or from primary storage elements is monitored so that an approximate additive calculation can be done.

PB81-802035 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Swimming Pool Design, Construction, and Operation. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 191p
Supersedes PB80-802747, and NTIS/PS-78/1272.

Design, construction, and operation of both indoor and outdoor swimming pools are discussed in abstracts from worldwide literature. Lighting, ventilation, dehumidification, filtration, chemical water treatment, and heating by electricity, gas, heat pumps, and solar energy are covered. (This updated bibliography contains 184 citations, 19 of which are new entries to the previous edition.)

PB81-856411 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Water Cooling Towers for Manufacturing Processes. January, 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 188p NERACEI NT2608
Sponsored by National Technical Information Service, Springfield, VA.

Worldwide information covers design, construction, and applications of dry and wet cooling towers. The citations contain nothing pertaining to fossil fuel or nuclear power plants. Various techniques to treat corrosion and water deposits are included. (Contains 189 citations, fully indexed and including a table of contents.)

PB81-856783 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Oil Burners. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 86p NERACUSGNT2161
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography cites reports relating to studies, design, construction, and materials for oil burners using crude oil fuel or shale oil fuel. Topics on low excess air burners, dual fuel burners, reduction of pollutants, and ultrasonic jet atomization in burners are also included. (Contains 67 citations, fully indexed and including a table of contents.)

PB81-857013 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Arc Heating. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Dec 80, 159p NERACIAANT2534
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover techniques of plasma production and heating, plasma microwave heating systems, dismountable inductively coupled plasma torch apparatus, design considerations for plasma arc heating devices, waste disposal by plasma arc heating, improvements in production processes by the use of plasma arc heating, plasma heating ovens, and surface heat treatment using a plasma torch. An analysis and evaluation of plasma arc heating are also included in this bibliography. (Contains 161 citations, fully indexed and including a table of contents.)

PB81-857138 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of District Heating. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Jan 81, 76p NERACEDBNT2692
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the economic analysis of worldwide techniques and technology for district heating for industrial and residential consumption. Various tpyes of thermal power plants for hot water generation and space heating are considered along with feasibility studies and comparative evaluations for district heating in general and at specific geographic locations. (Contains 62 citations, fully indexed and including a table of contents.)

SERI/PR-721-788 PC **A09**/MF **A01**
Solar Energy Research Inst., Golden, CO.
Program Area Plan. Performance Evaluation of Passive/Hybrid Solar Heating and Cooling Systems.
Oct 80, 199p
Contract AC02-77CH00178

The primary objective of the Passive and Hybrid Systems Performance Evaluation Program is to support both system development and market development for passive and hybrid heating and cooling systems through a nationally coordinated program of quantitative and qualitative performance evaluation. The objectives of the plan, both generally and in terms of meeting the highest priority data needs of the various end uses and end users of performance evaluation data are defined. The issue of acquiring data on highest priority combinations of system types, locations, applications, and costs for various potential end users is addressed. A strategy is proposed to balance data needs with the resources available. Data needs are organized and matched to data sources, specifically Test Rooms and Class A, B, and C Monitored Buildings. Projected numbers of sites for each type of data source and projected uses of these various data sources for prototype testing in support of specific system development activities are given through FY 1984. Data acquisition in support of market development is also described followed by a proposed management strategy for the entire program. The technical and management methods to be employed to implement the program at each level of performance evaluation are presented, and specific tasks to be performed during FY 1981 and FY 1982 are discussed. (ERA citation 06:004688)

STU-78-3962 PC **A02**/MF **A01**
Styrelsen foer Teknisk Utveckling, Goeteborg (Sweden).
Residential Heating with Low Temperature Heat Sources.
L. O. Grudeborn. Feb 80, 10p
In Swedish.
U.S. Sales Only.

Low temperature heat sources can not be used in ordinary water radiator systems for residential heating, because the surface area of the radiators has to be increased a lot if the water temperature decreases considerably below 80 exp 0 C. On the other hand it is possible to use low temperature heat for space heating if you use heated air. An apparatus for heating of air with low temperature heat has been developed within this project. The temperature of the air has to be only 8 to 10 exp 0 C over the normal room temperature. (ERA citation 06:004994)

13B. Civil Engineering

AD-A094 246/6 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS. Structures Lab.

Concrete Deterioration in Spillway Warm-Water Chute, Raystown Dam, Pennsylvania.
Final rept.,
Terence C. Holland, Tony B. Husbands, Alan D. Buck, and G. Sam Wong. Dec 80, 55p WES/MP/SL-80-19, CTIAC-42

The concrete in the walls and floor of the warm-water chute of the spillway of Raystown Dam, a relatively new structure (less than 10 years old), was showing an excessively rapid deterioration in quality. Surface concrete appeared extremely sandy and rough, resulting from an apparent dissolving away of cement paste and coarse aggregates. In addition to the surface problems, the walls separating the warm-water chute from the main spillway chutes contained interconnected voids, allowing water to flow under and through the walls. Several of these voids were large enough to reach inside. A limited sampling program provided concrete cores, aggregate, water, and efflorescence samples for chemical and petrographic analysis. A review of the pH history of the water in the reservoir was also conducted. The petrographic examination revealed that the surface concrete had been attacked by an aggressive liquid. Calculation of the Langlier Index for the reservoir water showed it to be aggressive to concrete. The pH history and the lack of evidence of introduction of acid into the reservoir, coupled with the chemical and petrographic evidence, led to the conclusion that the water itself was causing the surface damage. The voids in the walls were attributed jointly to poor consolidation of the concrete and design details which allowed the agressive water access to the interior of the walls. This is believed to be the first reported case of aggressive water attack on a concrete structure in the United States. (Author)

AD-A094 252/4 PC **A06**/MF **A01**
Army Engineer District, Philadelphia, PA.
Prompton Lake Condition Report Dam, Outlet Works & Spillway, Periodic Inspection Report Number 2, July 1971, Lackawaxan River Basin, Lackawaxan River, Pennsylvania.
Nov 71, 120p Rept no. DAEN/NAP-14620/PIR2-71/11

This report describes the Prompton Lake project, sets schedules for inspections, describes in detail the instrumentation installed and evaluation of the data gathered in the inspection of Prompton Lake during 21 July 1971. Piezometer data and a conduit settlement study for outlet works were also reported. It was found that the project is considered in overall good condition with adequate instrumentation to measure performance of the dam during operation. (Author)

AD-A094 356/3 PC **A07**/MF **A01**
EG and G Washington Analytical Services Center, Inc., Rockville. MD.
Investigation into Deep-Draft Vessel Berthing Problems at Selected U. S. Naval Facilities.
Final rept.,
John F. Hoffman. Oct 80, 142p Rept no. EG/G-4914-801
Contract N00014-77-C-0420

Described in this report are the results of a detailed investigation of shoaling in the pier slips and associated waterways of six deep-draft harbors used by the U.S. Navy. These are the Naval Air Station at Alameda, CA; the Naval Station and Naval Shipyard at Charleston, SC; the Naval Station at Mayport, FL; the Naval Station at Norfolk, VA; the Naval Air Station at Pensacola, FL; and the Naval Air Station North Island, San Diego, CA. In addition to shoaling, the bioclogging of the screens of aircraft carriers' 'sea chests' at Norfolk, VA was investigated. Tidal extremes for the subject harbors were updated to the latest information available from the National Ocean Survey. Methods of dredging commonly used to dredge pier slips are described together with less-frequently used methods that have been used in slip maintenance. The problem of offshore as well as onshore dredge spoil disposal is addressed. Included are discussions on the use of the elutriate test, the bioassay, and the in-situ bioassay in determining the toxicity of the dredge spoil. A section in the report addresses methods of sediment control. Information in this report based on interviews and other research is contained in sections entitled: Ship Movement, Current Velocity, Elevations of Bottom Tips of Pilings, Shoaling and Shoaling rate, Submarine Sediments Dredging, Dredge Spoil Disposal, Problems, and Recommendations. In addition to recommendations for specific Naval installations, eight general recommendations are made. (Author)

AD-A094 424/9 PC **A15**/MF **A01**
Northrop Services, Inc., Las Vegas, NV.
Williams Air Force Base Air Quality Monitoring Study. Appendices,
D. C. Sheesley, S. J. Gordon, and M. L. Ehlert. Jul 80, 329p EPA/600/4-80-037-APP, AFESC/ESL-TR-79-33-APP
Contract EPA-68-03-2591
Appendices to AD-A092 165.

This report presents an evaluation of the impact of aircraft operations on air quality at Williams Air Force Base near Phoenix, Arizona. The data reported here will serve as input for defining the accuracy limits of the Air Quality Assessment Model.

AD-A094 606/1 PC **A03**/MF **A01**
Cold Regions Research and Engineering Lab., Hanover, NH.
Structural Evaluation of Porous Pavement Test Sections at Walden Pond State Reservation, Concord, Massachusetts.
Special rept.,
Robert A. Eaton, and Peter C. Marzbanian. Dec 80, 49p Rept no. CRREL-SR-80-39

This report presents the results of repeated load tests upon various porous pavement test sections constructed in an overflow parking lot at Walden Pond State Reservation in Concord, Massachusetts. From the fall of 1977 to the spring of 1979, the seasonal structural responses of the sections were monitored with a repeated plate bearing apparatus. After the first set of fall and spring tests, some sections were reconstructed because the asphalt concrete pavement was not porous enough. Test points were added or replaced to accommodate the reconstructed sections. Results show that the dense asphalt concrete distributed the load over a greater area than the porous asphalt concrete, thicker pavements were stronger for both dense and porous asphalt concrete, and the deflection basin depth and diameter changed proportionately to applied loads. (Author)

EPRI-CS-1574 PC **A20**/MF **A01**
Atomics International Div., Canoga Park, CA. Energy Systems Group.
Aqueous Carbonate Process Design Study. Final Report.
R. L. McKisson, G. L. Bauerle, J. E. Bodine, R. D. Rennick, and A. E. Stewart. Oct 80, 466p

The Aqueous Carbonate Process (ACP) Design Study involved an experimental investigation of the regeneration subsystem of the Rockwell International Corporation Energy Systems Group closed cycle flue gas desulfurization process. The process involves a spray dryer in which the flue gas is scrubbed and its sulfur removed as a dry sodium sulfite/sulfate plus sodium carbonate mixture. This is followed by a regeneration process which involves the reduction of the sulfite/sulfate to sulfide in a molten salt bed. Then, using the CO sub 2 produced in the molten salt bed, the sulfide is stripped from an aqueous solution of the melt as H sub 2 S which is oxidized to elemental sulfur in a Claus plant. The sodium salts are concurrently converted to a sodium carbonate solution which is recycled to the spray dryer as the absorbent solution. This program involved studies of the molten salt reduction step and the aqueous regeneration steps plus a corrosion study of the aqueous process liquors. A process flow diagram and a material balance were developed based on coal-reduction process data developed in the study. It was observed that the reduction process was more difficult to operate with coal than with coke. The greater ash content of the coal and thus of the reducer melt, is a major factor in determining the operating temperature of the reducer, with the result that the coal-reduction required a bed temperature about 55 exp 0 C (100 exp 0 F) higher than that for coke-reduction. It is concluded that the ACP closed cycle process can operate effectively using coal as the reductant, although the use of coke offers more operational flexibility. (ERA citation 06:004483)

EPRI-FP-1006(V.1) PC **A14**/MF **A01**
Princeton Univ., NJ.
Electrostatic Precipitator Plate Rapping and Reliability. Volume 1. Finite Element Analysis and Laboratory-Scale Testing of Rapped Precipitator Plates. Final Report.
D. P. Billington, D. A. Nagy, P. C. Y. Lee, and R. Mark. Sep 80, 324p

The objective of this study was to develop a data base and analytical model which could, in the long term, lead to a design and optimization methodology for the design of collecting surfaces for use in electrostatic particulate precipitators. Response to varying in-plane rapping intensities was measured in the in- and out-of-plane directions. The dynamic response was obtained as a function of time, location, rapper and plate configuration. These data were obtained on full scale plates. In addition, laboratory scale experiments were conducted to determine the effect of dust on surface response. The data obtained show that the dynamic response of the collecting surface is extremely complex. The stress waves generated by rapping travel at sonic velocities. These waves cause both complex in-plane and out-of-plane accelerations. The in-plane accelerations reach a maximum prior to the out-of-plane accelerations. Dust will dampen the response. Based on these findings it is evident that additional work should be undertaken to evaluate the contribution of each acceleration mode, and intensity, on dust removal and reentrainment. (ERA citation 06:004766)

NUREG/CR-1717-V-3 PC **A05**/MF **A01**
Brookhaven National Lab., Upton, NY.
Soil-Structure Interaction Methods. Volume III. SIM Code,
C. A. Miller, and C. J. Costantino. Jan 81, 99p
BNL-NUREG-51263-VOL-3
Contract DE-AC02-76CH00016
See also Volume 1, NUREG/CR-1717-V-1. Prepared in cooperation with City Univ. of New York.

SIM Code treats the forced response of a partially buried structure to a specified disturbance traversing the location of the structure. A solution to this problem requires consideration of the structural model; soil/structure interaction; the free field disturbance; and numerical aspects of the solution. Each of these are discussed.

PATENT-4 119 581
Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Membrane Consisting of Polyquaternary Amine Ion Exchange Polymer Network Interpenetrating the Chains of Thermoplastic Matrix Polymer.
Patent,
A. Rembaum, and C. J. Wallace. Filed 23 Feb 77, patented 10 Oct 78, 11p N81-14076/6, PAT-APPL-771 245
Supersedes PAT-APPL-771 245-77. Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An ion exchange membrane was formed from a solution containing dissolved matrix polymer and a set of monomers which are capable of reacting to form a polyquaternary ion exchange material; for example vinyl pyride and a dihalo hydrocarbon. After casting solution and evaporation of the volatile component's, a relatively strong ion exchange membrane was obtained which is capable of removing anions, such as nitrate or chromate from water. The ion exchange polymer forms an interpenetrating network with the chains of the matrix polymer.

PB81-129082 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Pipelines Considered as a Mode of Freight Transport: A Review of Current and Possible Future Uses,
J. G. James. c1980, 50p TRRL-SUPPLEMENTARY-592
Also pub. as ISSN-0305-1315.

Pipelines are perhaps the least appreciated mode of freight transport. The unobtrusive distribution of

many megatonnes of water, oil and gas in the UK annually is taken for granted and only the figures for oil appear in annual freight statistics. The transport of solids by hydraulic or pneumatic pipeline-either in free flow or packed into capsules - is technically more difficult and less common, but the practice is already well-established in certain specialized fields. After a brief introduction to the statistics for various freight transport modes, the author reviews the current usage of pipelines for water, sewage, gas and oil, before examining at length hydraulic 'slurry' pipelines for a variety of minerals. The report concludes with a brief note on capsule pipelines which, apart from small-bore in-house delivery systems, are still in the prototype stage. A bibliography of over 100 references is given. (Copyright (c) Crown Copyright 1980.)

PB81-129181 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Some Analyses of Traffic Data for Three Steel Bridges,
J. Page, and G. P. Tilly. c1980, 37p TRRL-SUPPLEMENTARY-598
Also pub. as ISSN-0305-1315.

This report is one of a series that describe the TRRL contribution to a joint European research project to study traffic loads and stresses in steel bridges, and it discusses traffic load data obtained at three bridges. The axle load data are more detailed than are normally available, for instance front and rear axles are considered separately because front axles are shown to make a significantly greater contribution to potential fatigue damage than previously thought. A curve fitting procedure for the front and rear axle load spectra is adopted. A method of defining the fatigue damaging potential of an axle load spectrum is described; it has been called the Characteristic Axle Load of the spectrum. Axle load data by vehicle class are given for two bridges; the 2-axled rigid is the most common commercial vehicle, followed by the 4-axled articulated. In terms of fatigue damaging potential, however, the 4-axled articulated is worst. Characteristic axle loads are given for the overall axle load spectra for the eleven bridges in the joint project; the British bridges have the lowest values. A value is also given for one of the most heavily trafficked roads in Britain to provide an 'upper bound' estimate for British traffic. A comparison of the frequency of occurrence of the vehicle classes is also given for the eleven bridges. (Copyright (c) Crown Copyright 1980.)

PB81-132417 PC **A03**/MF **A01**
Water and Power Resources Service, Denver, CO. Engineering and Research Center.
Teton Dam-Foundation Grout Testing Program,
Ronald J. Bard. Dec 79, 42p REC-ERC-79-2

After failure of Teton Dam in Idaho on June 5, 1976, the Secretary of the Department of the Interior appointed the Interior Teton Dam Failure Review Group (IRG) to investigate the failure. The Grouting Task Group of the IRG requested that the Bureau of Reclamation initiate a program to test foundation grouts similar to those used during construction of Teton Dam. Grouts were to be (1) made with the same cement, sand, bentonite, and calcium chloride as were used during construction, (2) made using mix proportions representative of grouts used during construction, and (3) mixed and cured as congruently to field conditions as possible. Tests performed on grouts from 66 mixes included: time of setting, unconfined compressive strength, triaxial shear strength, drying shrinkage, erodibility, and permeability. Bleeding characteristics were also analyzed, and a detailed petrographic examination was performed. All grouts exhibited good hydration properties and good physical soundness, adequate strengths, no degradation due to calcium chloride, and low permeability. Areas of future research in neat-cement and sand-cement grouts are also listed.

PB81-132540 PC **A04**/MF **A01**
Transportation Research Board, Washington, DC.
Emulsion Mix Design, Stabilization, and Compaction,
H. Fred Waller, Jr., Michael I. Darter, Richard G. Wasill, Steven R. Ahlfield, and Michael S. Mamlouk. 1980, 63p TRB/TRR-754, ISBN-0-309-03067-6
Library of Congress catalog card no. 80-25049.
Also pub. as ISSN-0361-1981.
Paper copy also available from Transportation Research Board, 2101 Constitution Ave., NW, Washington, DC. 20418.

The 10 papers in this report deal with the following areas: emulsion mix design methods: an overview; use of Marshall equipment in development of asphalt emulsion mixture design methods and criteria; laboratory evaluation of asphalt emulsion mixtures by use of the marshall and indirect tensile tests; use of the Hveem stabilometer test in design procedure for emulsified-asphalt mix; mix-design procedures for open-graded emulsion mixes; mechanistic thickness-design procedure for soil-lime layers; use of cement-kiln dust and fly ash in pozzolanic concrete base courses; dependence of compacted-clay compressibility on compaction variables; stabilization of a sanitary landfill to support a highway; and prediction of density and strength for a laboratory compacted clay.

PB81-134900 PC **A04**/MF **A01**
Minnesota Univ., Minneapolis. Water Resources Research Center.
A History of Drainage Law in Minnesota with Special Emphasis on the Legal Status of Wet Lands,
K. Elton King. Nov 80, 56p WRRC/BULL-106, W81-00969, OWRT-A-040-MINN(6)
Prepared in cooperation with Mankato State Univ., MN. Dept. of Biological Sciences, Limnological Contribution No. 11.

A capsulized view was presented of the laws and attitudes that have shaped the drainage history of Minnesota and have formed the basis for Minnesota's present drainage law. The presentation was divided into three temporal periods: 1858-1920 (drainage period I (DP-I)), 1920-1960 (DP-II), and 1960-1979 (DP-III). DP-I in Minnesota's history was a time of extensive drainage activity. Of the total land acreage incorporated into drainage enterprises by 1960, over 79% was affected by ditching before 1920. Acts that facilitated drainage and the legal status of State water bodies were discussed for this period. DP-II represented a time of transition in State attitudes towards drainage and water; while DP-III very likely witnessed the most dramatic statutory changes in State drainage history for water resources protection and management. Special importance was place on the evolution of the law as pertaining to wetlands. A set of appendices provided a more detailed view of certain laws and significant legal precedents. It was concluded that, if present economic patterns persist, and landowners become dissatisfied with present laws governing public waters, more drainage is likely; and, with each wetland drained, conflicts over those remaining will escalate.

PB81-134918 PC **A06**/MF **A01**
Clemson Univ., SC. Water Resources Research Inst.
A Five-Year Water Resources Research and Development Goals, Objectives and Priorities for South Carolina, 1982-1987,
P. B. Zielinski, and J. Vorgettes. Aug 80, 113p WRRI-91, W81-00986

The five-year water resources research plan for South Carolina presented background meteorological, hydrological, and geological information, a description of past/current studies, and identified water problems. Water quality problems identified included ground/surface water pollution source identification, coastal zone groundwater pollution, waste discharges in surface waters, improved treatment performance needs for waste stabilizaton ponds, reduction of siltation and high nutrient levels in order to reverse lake eutrophication, and monitoring and safe disposal of toxic waste.

PB81-134983 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Geophysical and Television Borehole Logging for Probing Ahead of Tunnels,
G. West. c1980, 45p TRRL-LR-932
Also pub. as ISSN-0305-1293.

Laboratory and underground trials of geophysical and television logging in a horizontal borehole have been made with the object of assessing their potentiality for use in probing ahead of tunnels. The commercially-available geophysical logging methods tested were gamma-gamma (long and short spacing), natural gamma, neutron-neutron, neutron-gamma, self-potential and resistivity; in addition a commercially-available borehole television camera was tested and a new ultrasonic velocity logger was designed and used. It was concluded that: (1) Of the commercially-available geophysical logging methods, only the gamma-gamma method would seem to be useful in probing ahead of tunnels; it provided a good overall measure of density. (2) The borehole television camera was most successful in showing the presence of joints, cavities and other features. (3) The prototype ultrasonic velocity logger provided a general indication of rock strength and could readily be developed for use in routine probing ahead. (Copyright (c) Crown Copyright 1980.)

PB81-135071 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Estimating Resources and Costs for Highway Works - Development of the 'RATE' System,
B. S. Parmenter. c1980, 25p TRRL-LR-957
Also pub. as ISSN-0305-1293.

The development is described of a computer system designed to aid management in budgeting, estimating, planning and resource control for highway construction and maintenance. 'RATE' -- Resource Allocation and Techniques of Estimating -- provides engineers with Bills of Quantities, priced or unpriced, together with schedules of labor, plant and materials required for each job. The development has been undertaken jointly by Local Highway Authorities and a firm of computer consultants under contract to the Transport and Road Research Laboratory who also contributed in cooperation with the Department of Transport. (Copyright (c) Crown Copyright 1980.)

PB81-135097 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Earth Pressures Against an Experimental Retaining Wall Backfilled with Silty Clay,
D. R. Carder, R. T. Murray, and J. V. Krawczyk. c1980, 25p TRRL-LR-946
Also pub. as ISSN-0305-1293.

The measurement is described of the lateral soil pressures produced by the compaction of a silty clay backfill against a 2 meter high retaining wall. In addition to monitoring the soil pressures and the total vertical and horizontal thrusts acting on the wall, measurements of pore water pressure were made to establish the effective stress state of the soil fill. Following completion of the filling operations, the conditions were maintained for several months to observe changes in pressure acting on the wall as a result of excess pore pressure dissipation. Thereafter, active and passive failures of the soil were induced by rotating the wall about its toe. The investigation indicated that significantly higher lateral pressures were developed on the 2 meter high wall than could be created by the self weight of the soil fill. These high pressures were attributed to the influence of the compaction plant. The study also demostrated that only a very small rotation of the experimental wall (approximately 1/20 degree) was required to achieve the active state. The passive condition, which was investigated using 1 meter height of fill, required in excess of 7.5 degrees to mobilize the full passive resistance of the soil. (Copyright (c) Crown Copyright 1980.)

PB81-135139 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Seismic Refraction Surveys for Highway Engineering Purposes,
M. Stewart, and P. J. Beaven. c1980, 31p TRRL-LR-950
Also pub. as ISSN-0305-1293.

This report describes field procedure and interpretation techniques for seismic refraction surveys of the appropriate standard for highway engineering purposes. The principles of seismic refraction survey and typical site requirements are described, followed by a general description of the types of equipment needed for a survey. Single-channel

equipment is normally used with a hammer energy source, and multi-channel equipment is normally used with a hammer energy source, and multi-channel equipment with explosive as the energy source. A code of practice for the handling of explosives is given. Site operations are described for the simpler-single-channel instruments and for multi-channel equipment. It is emphasized that preliminary interpretations and calculations should be made in the field to check that enough information has been collected for satisfactory analysis. Two types of analysis are described. The first assumes that refraction occurs at a plane interface and the depth below each shot point is calculated for a three layer case. The second technique can be used to calculate the depth of a refractor beneath a geophone, and formula are given to extend this to three layers. For this extended analysis additional field data is needed. The final section of the report describes some of the unusual situations which may lead to inaccurate interpretation of survey data. (Copyright (c) Crown Copyright 1980.)

PB81-135147 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Distribution Models for the Journey to Work,
J. C. Tanner. c1980, 32p TRRL-LR-951
Also pub. as ISSN-0305-1293.

The report describes two alternative approaches to modelling the distribution of work journeys for given locations of homes and of jobs. The first approach is the traditional one based on a deterence function or a gravity model; the second is based on random utility theory, in which each individual chooses his home or workplace or both so as to maximize his perceived utility. (Copyright (c) Crown Copyright 1980.)

PB81-135667 PC **A03**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
A Review of Traffic Loads and Stresses in Steel Bridges,
G. P. Tilly, and J. Page. c1980, 34p TRRL-SUPPLEMENTARY-596
Also pub. as ISSN-0305-1315.

This report is a review concerned with traffic loads and the dynamic stresses they cause in highway bridges. Special attention is given to techniques of measurement and to the nature of the load and stress spectra. The review was undertaken as part of a programme of research relevent to wholly steel bridges. The different types of dynamic weighbridge used to measure wheel loads are summarised. These measure total (dynamic plus static) load and must be sited in a smooth straight road to minimise dynamic effects. Units which can be fixed to the road surface as pads are very convenient but not very accurate except as indicators of general trends. Units which are installed in pits can give accuracies of + or - 10 per cent. Measurement of dynamic stresses requires considerable care to eliminate features such as noise and temperature drifting In cases where fatigue is in question it is necessary to measure the full range of stresses. Stress histories can be complex and constituent cycles are counted using a method such as range-pairs or a variation. For lightweight steel decks, stresses close to the deck plate are reduced by the structural action of asphalt surfacings; the degree of reduction is affected by temperature and vehicle speed. Dynamic behaviour of vehicles is considered. Variations of wheel load occur even on a very smooth road surface so that the traffic induced stresses are affected by factors such as vehicle speed, and type of suspension. (Copyright (c) Crown Copyright 1980.)

PB81-135873 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Better Justifications Needed for Automated People Mover Demonstration Projects.
Report to the Congress.
19 Aug 80, 41p CED-80-98

The Urban Mass Transportation Administration has established a program to demonstrate whether automated people mover systems are workable solutions to downtown transit problems. These systems are driverless vehicles operating on fixed guideways. The program includes nine projects with a potential cost to the Federal Government of nearly $675 million. Four of these projects were added at congressional direction. The Federal agency states that four of the five projects that were not congressionally directed are needed to meet program objectives. However, it has not adequately clarified the unique contributions each project will make toward meeting the objectives or why fewer projects and existing information are not sufficient. In addition, the planned evaluation of these projects should be strengthened.

PB81-141525 PC **A14**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Atmospheric Chemistry of Selected Sulfur-Containing Compounds Outdoor Smog Chamber Study - Phase 1.
Final rept. Sep 76-Feb 78,
J. E. Sickles, II, R. S. Wright, and Bruce W. Gay, Jr. Dec 79, 307p EPA-600/7-79-227
Contract EPA-68-02-2437

The chemical behavior of hydrogen sulfide, carbonyl sulfide, carbon sulfide, methanethiol, ethanethiol, methyl sulfide, ethylsulfide, methyl-disulfide, ethyldisulfide, methylethylsulfide, thiophene, 2-methylthiophene, 3-methylthiophene, 2,5-dimethyl-thiophene and propene (used as a control) was investigated under atmospheric conditions in outdoor smog chambers. Target initial concentrations of 2.0 ppm carbon of a test compound and 0.1, 0.2, 0.5 and 1.0 ppm NOx were investigated simultaneously in four identical smog chambers. A total of twenty 2-day four-chamber runs, or eighty 2-day experiments involving irradiated sulfur species-NOx or propene-NOx systems was conducted. The results of experiments conducted with each compound were analyzed by examining the influence of initial conditions on the following selected reaction parameters: the time to NO-NO2 crossover; maximum concentration of O3, NO2, PAN, SO2, particulate, and condensation nuclei; nitrogen mass balance; time to one-half consumption of the test species; and second-day net ozone concentration. Subsequently, selected reaction parameters were compared across test compounds.

PB81-141541 PC **A11**/MF **A01**
KLD Associates, Inc., Huntington, NY.
Development and Testing of INTRAS (Integrated Traffic Simulation), a Microscopic Freeway Simulation Model. Volume 1. Program Design, Parameter Calibration and Freeway Dynamics Component Development.
Final rept.,
D. A. Wicks, and E. B. Lieberman. Oct 80, 243p KLD-TR-64, FHWA/RD-80/106
Contract DOT-FH-11-8502
See also Volume 2, PB81-141558, and report dated Jan 76, PB-258 994.

This series of volumes documents the work performed to adapt a freeway simulation model for studying freeway incidents. The resulting program, INTRAS (INtegrated TRAffic Simulation), is a vehicle-specific time-stepping simulation designed to realistically represent traffic and traffic control in a freeway and surrounding surface street environment. This volume describes the detailed capabilities of INTRAS and its structural and procedural attributes. The calibration of traffic descriptive parameters are presented. The development of the simulation components which model the car-following lane changing and vehicle generation aspects of freeway traffic are also included.

PB81-141558 PC **A16**/MF **A01**
KLD Associates, Inc., Huntington, NY.
Development and Testing of INTRAS (Integrated Traffic Simulation), a Microscopic Freeway Simulation Model. Volume 2. User's Manual.
Final rept.,
D. A. Wicks, and B. J. Andrews. Oct 80, 371p KLD-TR-65, FHWA/RD-80/107
Contract DOT-FH-11-8502
See also Volume 1, PB81-141541, and report dated Feb 76, PB-258 995.

This series of volumes documents the work performed to adapt a freeway simulation model for studying freeway incidents. This volume describes the detailed procedures needed to apply the INTRAS Program to the study of traffic operations in a freeway environment.

PB81-141566 PC **A08**/MF **A01**
Radian Corp., Austin, TX.
Frequency of Leak Occurrence for Fittings in Synthetic Organic Chemical Plant Process Units.
Final rept. Nov 79-Sep 80,
J. R. Blacksmith, G. E. Harris, and G. L. Langley. Jan 81, 169p EPA-600/2-81-003
Contract EPA-68-02-3171

The report summarizes results of a study of the frequency of leak occurrence in the synthetic chemical manufacturing industry (SOCMI). The frequency of occurrence of fugitive emissions was determined by instrumental screening, defined as measurement of the concentration of volatile organic compounds (VOCs) as close as possible to the point of suspected leakage (e.g., the valve stem, pump seal). The screening value is the maximum repeatable VOC concentration detected for any given source expressed in parts per million by volume (ppmv). A total of 24 process units in the SOCMI were tested. The frequency of fugitive emissions sources with screening values equal to or greater than 10,000 ppmv was tabulated for all units combined, for each type of chemical process, and for each process unit.

PB81-141582 PC **A11**/MF **A01**
California Univ., Santa Barbara. Marine Science Inst.
Oil Pollution Abstracts. Volume 7, Number 2 (July 1980-November 1980).
Semiannual rept.,
Helmut Ehrenspeck, Christine Matuck, and Kim Judson. Jan 81, 233p EPA-600/2-81-004
Grant EPA-R-807366
See also report dated Mar 80, PB80-191067.

This is the twenty-third and final issue of Oil Pollution Abstracts, a basic reference guide to current scientific and technical literature relevant to terrestrial and aquatic oil pollution. This issue contains 450 bibliographic entries with abstracts, covering the years 1977 to 1980. The entries are arranged in eight major topical categories comprising thirty-seven specific subcategories. The major categories are as follows: Oil pollution detection, analysis and evaluation; oil pollution prevention, repsonse and control; environmental impacts of oil pollution; fate of oil in the environment; pollution aspects of oil exploration, development and production; pollution aspects of oil transport, transfer and storage; petroleum and petrochemical industry waste treatment and disposal; and miscellaneous publications.

PB81-141624 PC **A05**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Regulatory Analysis: Proposed Premanufacture Notification and Review Procedures. Proposed Rule, Section 5, Toxic Substances Control Act.
Oct 80, 81p EPA-560/12-80-006

Section 5 of the Toxic Substances Control Act (TSCA) requires manufacturers and importers to notify EPA 90 days before they manufacture or import a new chemical substance. New substances are those that are not on the TSCA Chemical Substance Inventory, which was first published on June 1, 1979, and supplemented on July 30, 1980, by a Revised Inventory. EPA proposed regulations to implement section 5 requirements and to establish premanufacture notice and review procedures in the Federal Register of January 10, 1979 (44 FR 2242), October 16, 1979 (44 FR 59764), and August 15, 1980 (45 FR 54642). In this draft Regulatory Analysis, EPA explains the rationale for its proposal. The Regulatory Analysis also discusses the major issues raised by the proposed rules and describes the different alternatives the Agency considered for resolving the issues. The analysis is in part based on the proposed 'Economic Impact Analysis of Proposed Section 5 Notice Requirements,' prepared by ICF Incorporated of Washington, DC.

PB81-142630 PC **A12**/MF **A01**
Texas A and M Univ., College Station.

The Removal of Metals and Viruses in Advanced Wastewater Treatment Sequences.
Final rept. Jun 72-Dec 73,
Steven E. Esmond, Albert C. Petrasek, Jr., Harold W. Wolf, and D. Craig Andrews. Aug 80, 261p EPA-600/2-80-149
Grant EPA-S-801026

An extensive study of metals and virus removals by advanced wastewater treatment processes was conducted in Dallas, Texas from June 1972 through December 1973. Processes applied to a biologically nitrified effluent included chemical coagulation with alum and/or lime, high-pH lime treatment with and without recarbonation, filtration through multi- and dual-media filters, and carbon adsorption. The high-pH lime treatment with recarbonation provided a most effective treatment for both metals removals and disinfection. Boron surfaced as a material that may require other means of control. Although high-pH lime treatment was indicated to be extremely effective for virus removal (or inactivation), metals removal were not of the same order of magnitude. Thus, efforts to control metals at points of discharge are strongly supported. The removal of some metals by biological processes appeared to be influenced by their concentration. Median values were observed to be more indicative of the plant processes than mean values. Coliphages were observed to provide essentially the same virus removals values as poliovirus. The suggestion is made that all wastes should be subject to biological treatment, and if such treatment is found ineffective, then other means of control are warranted.

PB81-143307 PC **A05**/MF **A01**
Candeub, Fleissig and Associates, Newark, NJ.
Regional Coliseum Study - Columbus, Georgia. Technical Assistance Final Report.
Nov 80, 87p EDA-81-003

The report was prepared in two parts. The first section, Analysis of Market and Financial Feasibility, identifies pertinent market factors and indicators of facility demand. Section II, Site Analysis Plan, describes the procedure used to evaluate alternative sites and documents the detailed assessment of the primary site. The report is an investigation of the feasibility of building a coliseum in Columbus for recreation, entertainment and civic uses. The proposed coliseum is a replacement for the Municipal Auditorium.

PB81-143554 Not available NTIS
National Bureau of Standards, Washington, DC.
A Study of Particulates of Environmental Interest by Differential Thermal Analysis,
Oscar Menis, J. A. Mackey, and P. D. Garn.
1979, 12p
Pub. in Proceedings of Thermal Analysis Symp., Rappersville, Switzerland, April 18-30, 1979, p321-332 1979.

In this presentation the authors describe our current progress using thermoanalytical methods to study particulates of interest in environmental problems. The topics included are: (1) differential thermal analysis (DTA) of current NBS Standard Reference Material (SRM) 1645, River Sediment and NBS SRM 1648, Urban Particulate Matter (1); (2) studies of a suitable crystalline silica (a-quartz and cristobalite) as a potential SRM; (3) preparation of mixtures of chrysotile asbestos and quartz in a suitable matrix, and (4) a modified DTA apparatus including a design of a DTA cell for rapid sample changing and operation under regulated steam pressure.

PB81-144149 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
Many Water Quality Standard Violations May Not Be Significant Enough to Justify Costly Preventive Actions.
Report to the Congress.
2 Jul 80, 96p CED-80-86

This report presents a number of options to the Congress concerning the funding of advanced waste treatment projects. It also makes recommendations to the Administrator of the Environmental Protection Agency to help improve the way water quality standards are set and implemented and the procedures used in assessing the need for advanced waste treatment.

PB81-144156 PC **A06**/MF **A01**
Environmental Monitoring Systems Lab., Las Vegas, NV.
Four Corners Air Monitoring,
M. J. Pearson, M. Pitchford, and R. N. Snelling.
Nov 80, 105p EPA-600/4-80-053

This report presents data on mean seasonal total suspended particulates (TSP), sulfates, nitrates and elemental concentrations collected by a 28-station, high volume sampler network operated over a 3-year priod in the Four Corners area of Arizona, New Mexico, Utah and Colorado. Estimates of data quality are made based on results of an external quality assurance audit program. TSP values generally range from 10 to 50 micrograms per cubic meter and the sulfate/nitrate concentrations are generally less than 3 micrograms per cubic meter. All the data collected in this program are available in the U.S. Environmental Protection Agency's SAROAD (Storage and Retrieval of Acrometric Data) data system.

PB81-144172 PC **A06**/MF **A01**
Martin Marietta Corp., Baltimore, MD. Environmental Center.
The Air Quality Impact of the Coal-Fired Brandon Shores Power Plant. Volume I: Text,
Roger Brower. Sep 80, 125p PPSP-BS-80-2

The purpose of this modelling study is to determine (by mathematical prediction) the impact on Baltimore's air quality from burning coal at the Brandon Shores power plant. In this present analysis, only stack emissions of sulfur dioxide, total suspended particulates (TSP), and nitrogen dioxide were studied. Specifically, the impact analysis determines: Whether the SO2 and NO2 National Ambient Air Quality Standards (NAAQS) will be violated during various coal-burning situations at the plant; Whether the TSP NAAQS will be violated within the attainment region near the plant when coal is burned; Whether the increases in TSP ground-level concentration within the Baltimore TSP non-attainment zones are negligible; The amount of consumption of the SO2 PSD (Prevention of Significant Deteriorization) increment due to various coal-burning configurations at Brandon Shores.

PB81-144446 PC **A09**/MF **A01**
Abcor, Inc., Wilmington, MA. Walden Div.
Evaluation of Hot Acid Treatment for Municipal Sludge Conditioning.
Final rept.,
Kenneth J. McNulty, Ann T. Malarkey, Robert L. Goldsmith, and Henry A. Fremont. Aug 80, 178p EPA-600/2-80-096
Contract EPA-68-03-2459
Prepared in cooperation with Champion International Corp., Hamilton, OH.

Bench-scale tests were conducted to evaluate the technical and economic feasibility of the hot acid process for stabilization/conditioning of municipal sewage sludge. This process involves acidification of the sludge (pH 1.5-3) and heating to temperatures below boiling (approximately equal to C). Test results indicate that the process improves the dewaterability of the sludge, destroys essentially all pathogens, and preferentially solubilizes certain heavy metals relative to nitrogen and organics. The process demonstrated the potential for good solubilization and removal of toxic heavy metals including cadmium, zinc, and nickel with minimal solubilization of nitrogen. Thus the hot acid process improves the desirability of sludge solids for land application. A preliminary economic analysis of the process indicates that it is quite cost-competitive with alterntive stabilization/conditioning processes.

PB81-144453 PC **A06**/MF **A01**
South Dakota School of Mines and Technology, Rapid City.
Preventing Haloform Formation in Drinking Water.
Final rept. May 77-Feb 79,
Leland L. Harms, Robert W. Looyenga, and O. Thomas Love, Jr. Aug 80, 104p EPA-600/2-80-091
Grant EPA-R-805149

The Huron, South Dakota, water distribution system was monitored for trihalomethanes at several locations. Deposits from within the distribution system were evaluated as potential precursor material and were found to be precursors for the haloform reaction. Field tests designed to determine the extent of trihalomethane formation that occurs as a result of the pipe deposits were inconclusive. The deposits appear to be a precursor source, but they do not substantially alter the terminal trihalomethane concentration. Ammonium sulfate was used to convert to a combined chlorine residual in the distribution system. A significant drop in trihalomethane concentrations was obtained along with maintenance of adequate disinfection. Primary disinfection was obtained by lime softening followed by a free chlorine residual. Land used upstream from the raw water intake was evaluated for potential chloroform formation. Peak concentrations occurred near marshes, where cattle watered, and where the river was stagnant. Nine raw water quality parameters were monitored and correlated with THM formation. The best correlations were obtained with specific conductance and turbidity.

PB81-144487 PC **A05**/MF **A01**
Woodward-Clyde Consultants, San Francisco, CA.
Water Quality and Biological Effects of Urban Runoff on Coyote Creek. Phase I - Preliminary Survey.
Interim rept. Nov 77-May 79,
Robert Pitt, and Martin Bozeman. Aug 80, 85p EPA-600/2-80-104
Grant EPA-R-805418
Errata sheet inserted.

This preliminary report describes the characteristics of urban runoff affecting Coyote Creek, sources of urban runoff pollutants, effects of urban runoff and potential controls for urban runoff. Local urban runoff characterization information is summarized, and sources of urban runoff pollutants are being investigated and include sampling from source areas such as street surfaces, parking lots, landscaped areas and rooftops. Various biological sampling techniques were used to evaluate the fish, benthic macroinvertebrates and attached algae conditions in the creek, above and within the urban area. Creek water and sediment samples were also obtained and analyzed for a broad list of parameters. In most cases, very pronounced gradients of these creek quality indicators were observed, with the urbanized portion of the creek being significantly degraded. Current additional monitoring is being conducted to identify the urban runoff control goals necessary to improve creek quality to adequate levels.

PB81-144511 PC **A05**/MF **A01**
General Accounting Office, Washington, DC. Community and Economic Development Div.
EPA Should Help Small Communities Cope with Federal Pollution Control Requirements.
Report to the Congress.
30 May 80, 80p CED-80-92

Communities with populations under 10,000 find it much harder than larger communities to comply with Federal environmental regulations. For its review of the social and economic impact of Federal pollution control laws and regulations on cities, towns, and townships with populations under 10,000, GAO selected nine small communities in New England and the Pacific Northwest for indepth analysis of the problems federally funded sewage systems cause. GAO also obtained information on 20 other communities affected by two or more Federal pollution control requirements to determine what problems are caused by multiple pollution control requirements.

PB81-144644 PC **A03**/MF **A01**
Missouri Univ.-Columbia. Dept. of Sanitary Engineering.
Iron Removal by Rotating Contact Reactor.
Master's thesis,
Lyle W. Tharpe. May 79, 38p W81-00985, OWRT-B-124-MO(3)

Feasibility assessment was made of using a rotating contact reactor to remove iron (Fe(II) from water. Total soluble iron was determined using the Hach-Ferrozine method. The study was conducted in two phases: (1) determination of Fe(II) removal kinetics for the reactor at various flow rates, and (2) evaluation of the effect of disc surface area on overall Fe(II) removal. Hydraulic detention times less than fifty minutes reduced the percent remov-

al of Fe(II) (from about 99%), according to a first-order (linear) relationship between Fe(II) removal and contactor stage detention time (slope: 2.13/minute). The rotating contactor could achieve 96-99% removal of total iron from a ferrous iron feed stream having a concentration up to 28 milligrams per liter. With eleven or six rotating discs, 99% Fe(II) removal was obtained; but this declined to 81% with all discs removed. Since stabilization of the rotating contactor after changing the flow rate was achieved in such short times (one day or less) relative to times required for biological systems (5-6 days), the oxidation and removal of Fe(II) was probably due to physiochemical activity. Rotation of the discs promotes aeration and mixing, and increases the efficiency of Fe(II) removal.

PB81-144669 PC **A06**/MF **A01**
Hawaii Univ., Honolulu. Water Resources Research Center.
Recycling of Sewage Effluent by Sugarcane Irrigation: A Dilution Study, October 1976 to October 1978, Phase II-A.
Technical rept.,
Paul C. Ekern, Philip C. S. Loh, Reginald H. F. Young, Gordon L. Dugan, and L. Stephen Lau.
Mar 80, 118p TR-130, W81-00981
Contract DI-14-31-0001-3811
See also report dated Aug 77, PB-297 148.

An extension of the project, 'Recycling of Sewage Effluent by Irrigation: A Field Study on Oahu.' This portion's objective was to determine the dilution with Waiahole Ditch water necessary for optimal sugar yield when chlorinated, secondarily treated sewage was used for irrigation of cane. Hawaiian sugarcane variety 59-3775 was planted to a random-block design of treatments with 6 replicates in central Oahu near the Mililani Sewage Treatment Plant. The 5 irrigation treatments for the two-cane cycle were: (1) ditch water; (2)12.5%; (3) 25%; (4) 50% effluent diluted with ditch water; and (5) effluent the first year and ditch water the second. The ripener 'Polaris' was applied prior to harvesting. Crop logs monitored the cane growth and test plots hand harvested for assessment of cane and sugar yield. Soil water percolate and sewage effluent were chemically analyzed to check for human enteric viruses. Sugar yields for effluent concentrations up 25%, or for effluent the first year and ditch water the second, were equal to those from conventional ditch-water irrigation. There was a significant loss in juice quality and sugar yield for the 50% effluent concentrations. Immediately after each application of fertilizer and with effluent concentrations of 50 to 100%, the nitrate nitrogen concentrations in the percolate exceeded the critical level of 10 ppm for potable water. Total applications exceeded the sugarcane's ability to take up nitrogen; however, an apparent nitrogen deficit was assigned to gaseous nitrogen loss. No virus was recovered but 40% of the effluent reservoir samples were positive. At least 96% of the virus was inactivated after 1 day of storage.

PB81-144800 PC **A23**/MF **A01**
Denver Research Inst., CO.
Symposium on the Transfer and Utilization of Particulate Control Technology (2nd) Held at Denver, Colorado on July 23-29, 1979. Volume III. Particulate Control Devices.
Rept. for Jun 79-Jun 80,
F. P. Venditti, J. A. Armstrong, and Michael Durham. Sep 80, 549p EPA-600/9-80-039C, IERL-RTP-1063
Grant EPA-R-805725

The proceedings document the approximately 120 presentations at the EPA/IERL-RTP-sponsored symposium, attended by nearly 800 representatives of a wide variety of companies (including 17 utilities). The keynote speech for the 4-day meeting was by EPA's Frank Princiotta. The meeting included a plenary session on enforcement. Attendees were polled to determine interest areas: most (488) were interested in operation and maintenance, but electrostatic precipitators (ESPs) and fabric filters were a close second (422 and 418, respectively). Particulate scrubber interest appears to be waning (288). Major activities of attendees were: users, 158; manufacturers, 184; and R and D, 182. Technical presentations drawing great interest were the application of ESPs and baghouses to power plants and the development of novel ESPs. As important alternatives to ESPs, baghouses were shown to have had general success in controlling coal-fired power plant emissions. When operating properly, baghouses can limit emissions to less than 5 mg/cu nm at pressure drops of less than 2 kPa. Not all baghouse installations have been completely successful. Both high pressure drop and bag loss have occurred (at Harrington Station), but these problems appear to be solved.

PB81-144867 PC **A03**/MF **A01**
Skidmore, Owings and Merrill, Boston, MA.
Community Planning for Water Resources Management.
Sep 79, 28p W81-00970, OWRT-C-80104-P(8402)(2)
Prepared in cooperation with Environmental Research and Technology, Inc., Concord, MA.

This guidebook provides a step-by-step method to help local officials and concerned citizens solve their water resources problems by developing a community water resources management plan. Five specific steps are outlined in the planning process (1) definition of problems and goals; (2) collection and study of available data; (3) generation of a set of alternatives; (4) evaluation of the possible effects of each alternative; and (5) selection of a course of action leading from point of decision to implementation. Selection of the official or agency for a given town or city that is best prepared or most appropriate to initiating action was recommended. Numerous examples are provided for the detailed five-step process.

PB81-145195 PC **A21**/MF **A01**
TRW Environmental Engineering Div., Redondo Beach, CA.
Emissions Assessment of Conventional Stationary Systems: Volume III. External Combustion Sources for Electricity Generation.
Final rept.,
C. C. Shih, R. A. Orsini, D. G. Ackerman, R. Moreno, and E. L. Moon. Jan 81, 477p EPA-600/7-81-003A, IERL-RTP-1125
Contract EPA-68-02-2197

The report characterizes multimedia emissions from external combustion sources for electricity generation. Study results indicate that external combustion sources for electricity generation contribute significantly to the nationwide emissions burden. Flue gas emissions of NOx, SO2, and particulate matter from these sources account for approximately 50, 57, and 25%, respectively, of these pollutant emissions from all stationary sources. Additionally, flue gas emissions of sulfates and several trace elements from coal- and oil-fired utility boilers also require further attention. POM compounds in flue gas emissions are mostly naphthalene, phenanthrene, and pyrene. However, dobenz(a,h)anthracene and possibly benzo(a)pyrene, both active carcinogens, were detected at a limited number of coal-fired sites. A second major source of air emissions is vapors and drifts from cooling towers. Air emmissions of Cl, Mg, P, and sulfates from mechanical draft cooling towers were found to be comparable to flue gas emissions of these pollutants from oil-fired utility boilers. The multiple use of water in steam-electric plants results in wastewater streams from several operations. Overall, concentrations of Fe, Mg, Mn, Ni, and P are at levels that may be harmful. Average organic levels ranged from 0.01 mg/l for ash pound effluents to 6.0 mg/l for boiler blowdown. No POMs were detected.

PB81-145401 PC **A06**/MF **A01**
Urban Systems Research and Engineering, Inc., Washington, DC.
A Comparative Analysis of the Life Cycle Costs of Compliance Coal Versus Noncompliance Coal with Regenerable FGD Equipment at Brandon Shores Units 1 and 2. Volume 1.
Final rept.,
Christian Demeter, Christopher Pleatsikas, and Kevin Hollenbeck. Sep 80, 111p PPSP-BS-80-1

The relative costs of burning compliance coal and high sulfur coal with sulfur oxide removal are compared for the Brandon Shores Power Plant. Because of the plant's location next to potential markets for sulfur, sulfuric acid, and gypsum, only regenerable scrubbers were considered. The marketability of these products was surveyed and costs of coal and capital equipment were projected. For this plant, it was found that unless a highly optimistic scenario was adopted, compliance coal was the preferred option. The review of markets may be useful for comparison with non-regenerable scrubbers for new plants where scrubbers are required.

PB81-145617 PC **A05**/MF **A01**
Alabama Univ., University.
Treated Water Demand and the Economics of Regionalization. Volume 1. The Residential Demand for Treated Water.
Final rept. Apr 78-Dec 79,
Billy P. Helms, and J. F. Vallery. Aug 80, 93p EPA-600/2-80-162
Grant EPA-R-805617
See also Volume 2, PB81-117939.

The two-volume report examines the present and future demands and costs for residential water in view of the new requirements for water quality standards under the Safe Drinking Water Act of 1974 (PL92-523). Volume I investigates the determinants of residential water demand (including water price, family income, and appliance ownership) and develops a methodology by which utilities can determine future customer demand. A data base has been developed, and results of the analysis are given. These data can be used to test many hypotheses other than those examined in this study, and then could be a valuable tool for further research into the household demand for water. One of the most significant products of this research is the development of a information collection format that can be used by a water utility to collect data on household water use.

PB81-145708 PC **A05**/MF **A01**
Chicago Dept. of Public Works, IL. Bureau of Engineering.
Lawrence Avenue Underflow Sewer System. Interim Report: Planning and Construction.
Rept. for 1966-78,
Louis Koncza, Donald H. Churchill, and G. L. Miller. Mar 80, 88p EPA-600/2-80-014
See also report dated Nov 70, PB-210 854.

A new and bold concept in design of urban drainage systems was developed as a step forward in the solution of combined sewer overflow problems. A deep tunnel in bed rock about 200 to 250 feet (61 to 76 m) below the surface was designed and constructed for the Lawrence Avenue drainage basin in Chicago. Utilization of modern tunnel boring machines made the project economically competitive with conventional sewers while reaping additional benefits of ease in construction, no disturbance to traffic and least inconvenience to public. In addition, the tunnel sewer will serve as a reservoir totally capturing smaller storms, and trapping a significant portion of the first flush of pollutants from larger storms. The entrapped pollutional load will be pumped to a treatment plant through a pumping station to be operated only at the end of the storm, for dewatering the tunnel. The project is expected to reduce, to a large extent, the combined sewer overflows to the waterways.

PB81-145732 PC **A07**/MF **A01**
Environmental Protection Agency, Washington, DC. Office of Pesticides and Toxic Substances.
Chemical Screening: Initial Evaluations of Substantial Risk Notices, Section 8(e) July 1, 1979 to January 31, 1980. Volume 2.
Jul 80, 134p EPA-560/11-80-020

This collection of Status Reports (initial evaluations) was prepared by scientists in the EPA Office of Pesticides and Toxic Substances (OPTS) on submissions received between July 1, 1979 and January 31, 1980 from chemical manufacturers, processors, and distributors under Section 8(e) of the Toxic Substances Control Act (TSCA). The volume is being published for two reasons. First, the collection of status reports in a single volume will make that information more accessible to the public. Second, the volume may, by providing specific examples of submitted information and EPA's evaluation of it, help anyone subject to Section 8(e) to understand better the types of information that should be submitted to the Agency. To date, no information submitted under Section 8(e) has resulted in immediate regulatory action under

TSCA or any other act, although some submitted information has triggered further data gathering and evaluation that may lead to proposal of regulations in the future.

PB81-145765 PC **A10**/MF **A01**
Delamer, Inc., Cupertino, CA.
Research Outlook 1980,
Elaine Fitzbach. Feb 80, 225p EPA-600/9-80-006

This report is submitted to Congress annually to present EPA's 5-year plan for environmental research. The report focuses on such areas as Toxic Substances, Air, Water Quality, Wastewaters and Spills, Drinking Water, Solid and Hazardous Wastes, Pesticides, Non-ionizing, Radiation, Noise, and Energy.

PB81-145864 PC **A04**/MF **A01**
Army Engineer Waterways Experiment Station, Vicksburg, MS.
Improving the Distribution and Reducing the Magnitude of Pavement Damage.
Final rept. Jul 77-Apr 79,
Walter R. Barker, and Yu T. Chou. Aug 80, 68p
FHWA/RD-80/025
Contract DOT-FH-7-3-0067

An analytical study was conducted for both flexible and rigid pavements to evaluate different schemes for improving the distribution and reducing the magnitude of pavement damage. In the analysis of flexible pavement, the layered elastic theory was used to compute the pavement response. The horizontal strain at the bottom of the asphalt and the vertical strain at the top of the subgrade were used to predict the number of allowable strain repetitions. For the rigid pavement, finite difference, layered elastic theory, and Westergard procedures were all used to compute tensile stresses in concrete that formed the basis for predicting allowable stress repetitions. It was concluded that for flexible pavement the only effective means to reduce pavement damage was to modify the wheel assembly to reduce stress or strain at the critical locations in the pavement systems. The most effective modification would be to increase the spacing between duals. For rigid pavements, the edge effect was critical, thus suggesting that modifications to shift the loading away from the pavement edge would be effective.

PB81-145914 PC **A08**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Particulate Emission Factors Applicable to the Iron and Steel Industry.
Final rept.,
Thomas A. Cuscino, Jr. Sep 79, 155p EPA-450/4-79-028
Contract EPA-68-02-2814

An intensified effort has occurred in the last 3 years to update the iron and steel industry particulate emission factors presented in AP-42 and to add, for the first time, fugitive source emission factors. It is the objective of this report to present the results of this data gathering and analysis effort. The report is divided into three major areas. First, background information will be presented related to the processes in the iron and steel industry along with a process flow chart. Second, all of the particulate source test data will be presented and summarized in chart form. Third, the methodology for selecting single source specific emission factors and the resulting particulate emission factors will be presented.

PB81-146698 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Economic Implications of Regulating Nonaerosol Chlorofluorocarbon Emissions: An Executive Briefing.
Final rept.,
Adele Palmer, William E. Mooz, Timothy H. Quinn, and Kathleen A. Wolf. Jul 80, 35p R-2575-EPA, EPA-560/12-80-001A
Contracts EPA-68-01-3882, EPA-68-01-6111
See also PB81-146706.

This report documents a briefing presented to the Environmental Protection Agency on November 29-30, 1970. It summarizes the results of a three year Rand study of the economic implications of alternative policy approaches for controlling emissions of chlorofluorocarbons (CFCs) in the United States.

PB81-146706 PC **A04**/MF **A01**
RAND Corp., Santa Monica, CA.
Flexible Urethane Foams and Chlorofluorocarbon Emissions. A Support Document for Economic Implications of Regulating Chlorofluorocarbon Emissions from Nonaerosol Applications.
Final rept.,
William E. Mooz, and Timothy Quinn. Jun 80, 74p N-1472-EPA, EPA-560/12-80-001C
Contracts EPA-68-01-3882, EPA-68-01-6111
See also PB81-146698.

This report records the research in the single product area of flexible urethane foams. It is used to support the Rand Corporation's original report: PB81-146698, Adele R. Palmer, et al., Economic Implications of Regulating Chlorofluorocarbon Emissions from Nonaerosol Applications. It serves as a detailed exposition of the data and of the methods used to proceed from the historical data to the analysis of policies that might reduce CFC emissions. Flexible urethane foam plants are a significant source of CFC emissions. Each plant represents an extremely large point source of emissions, with hundreds of thousands of pounds of CFC-11 used and emitted annually per facility. Either CFC recovery or methylene chloride conversion could substantially reduce CFC releases to the atmosphere. The use of CFC in foam products is very sensitive to the price of CFC-11. The analysis suggests that substantial reductions in use can be induced by moderate price increases.

PB81-146722 PC **A03**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Asbestos Analytical Programs Bulk Sample Analysis: New York City and Maryland,
A. V. Rao, Corette Parker, Deborah Whitehurst, Don Lentzen, and Ty Hartwell. Sep 80, 41p EPA-560/13-80-21
Contract EPA-68-01-5848
Portions of this document are not fully legible.

This document describes the statistical analyses of bulk sample data taken from school buildings in two locations: New York City and Maryland. The bulk samples were analyzed for asbestos by various laboratories and the results given to the Research Triangle Institute for analysis. In particular, Section I of this report describes the analysis of the New York City data which reported the presence or absence of asbestos (Amosite or Chrysotile) in 474 bulk samples taken from various types of building material in New York City schools. Section II describes the analysis of the Maryland data which contains analysis of 37 split-asbestos bulk samples taken from Maryland public schools. The split-samples in Maryland were sent to two or more laboratories which determined presence or absence of asbestos (Amphibole and Chrysotile) as well as actual levels of asbestos found.

PB81-146987 PC **A04**/MF **A01**
Acurex Corp., Mountain View, CA.
Review of NOx Emission Factors for Stationary Fossil Fuel Combustion Sources.
Final rept.,
R. J. Milligan, W. C. Sailor, J. Wasilewski, and W. C. Kuby. Sep 79, 71p EPA-450/4-79-021
Contracts EPA-68-02-2611, EPA-68-01-4142

A review of recent NOx test data was performed, and summaries of emission factors presented for various types of stationary source combustion and for various fossil fuels. The effects of combustion modifications on NOx emissions are quantified. Background data are given to help the user determine the reliability of each factor in particular applications.

PB81-146995 PC **A04**/MF **A01**
SRI International, Menlo Park, CA.
Assessing the Representativeness of Ozone Monitoring Data.
Final rept.,
F. L. Ludwig, and E. Shelar. Jan 80, 75p EPA-450/4-80-001
Contract EPA-68-02-2548

Areas within which the National Ambient Air Quality Standard (NAAQS) for ozone is likely to have been exceeded are shown to be related to the observed annual second-maximum ozone concentrations. All sets of SAROAD stations separated by 500 km or less that had nearly complete annual data sets were considered for the years 1974 to 1977 to determine the probability that the NAAQS would be exceeded at one station of the pair, given the observed second-maximum ozone concentration at the other and their separation. Circles were drawn around each SAROAD monitoring site to show the area within which it is 95 % probable that the 120 ppb NAAQS has been exceeded for two or more hours during one or more years. The report describes meteorological situations and seasons during which high ozone concentrations are most likely in various parts of the country, so that special monitoring studies can be designed to supplement existing data. An aircraft monitoring protocol is given that will provide observations that are representative of ground-level conditions. Conditions that cause ozone data to be unrepresentative are described as are uncertainties associated with instrumental and calibration factors.

PB81-147001 PC **A04**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Measurement of Asbestos Air Pollution Inside Buildings Sprayed with Asbestos,
P. Sebastien, M. A. Billion-Galland, G. Dufour, and J. Bignon. Aug 80, 75p EPA-560-13-80-026
Contract EPA-68-01-5915
Trans. of document prepared for the French Ministry of Health and the French Ministry for the Quality of Life-Environment, 1977.

This report is a translation of a document prepared in 1977 for the French Ministry of Health and the French Ministry for the Quality of Life-Environment on the measurement and assessment of airborne asbestos levels in buildings throughout Paris. The methods of air sampling and transmission electron microscopic analysis, as well as a discussion of the results, are presented. Also included are extensive tables and figures summarizing the data collected. The study was completed in 1977, by the Laboratoire d'Etude des Particules Inhalees (Prefecture de Paris) and the Institut de Recherches Universitaires Sur l'Environment (Universite' Paris-Val de Marne). Mr. Patrick Sebestien (Prefecture de Paris) provided this revised update of the study in July 1980.

PB81-147027 PC **A04**/MF **A01**
Environmental Science and Engineering, Inc., Gainesville, FL.
Residential and Commercial Area Source Emission Inventory Methodology for the Regional Air Pollution Study.
Final rept.,
R. E. Holden, and W. E. Zegel. Sep 75, 63p
EPA-450/3-75-078
Contract EPA-68-02-1003

One of the major objectives of the Regional Air Pollution Study (RAPS) is to provide data on the emissions of air pollutants, meteorological conditions and ambient air quality with unprecedented density and resolution as to allow the testing and development of spectrum of mathematical models to simulate relationships between emissions of pollutants and air quality. As part of this effort a methodology for estimating the pollutant emissions from stationary residential and commercial-institutional area sources on an hour-by-hour basis and apportioning them to the RAPS grid system is presented.

PB81-147043 PC **A13**/MF **A01**
Research Triangle Inst., Research Triangle Park, NC.
Study of the Nature of Ozone, Oxides of Nitrogen, and Nonmethane Hydrocarbons in Tulsa, Oklahoma. Volume III. Data Analysis and Interpretation,
W. C. Eaton, M. L. Saeger, W. D. Bach, J. E. Sickles, II, and C. E. Decker. Sep 79, 296p EPA-450/4-79-008C
Contract EPA-68-02-2808
See also Volume 1, dated Apr 79, PB-300 481.

The 1977 Tulsa study was conducted to provide the EPA with a high quality data base for use in testing various photochemical simulation models. The monitoring program was designed to facilitate the observation of incoming pollutant transport

and the formation of ozone downwind. Pollutant and meteorological measurements were made from ground level monitoring sites and aboard an instrumented aircraft. This volume reports on the analysis and interpretation of measured parameters. Included are analyses of (1) the meteorological representativeness of the study area, (2) the statistical relationship of ozone to other parameters, (3) the hydrocarbon and aircraft ozone measurements, and (4) case studies of periods of high ozone concentrations.

PB81-147092 PC **A07**/MF **A01**
Engineering-Science, Inc., Denver, CO.
Spearfish Sewerage Needs, Lawrence County near Spearfish, South Dakota. Draft Environmental Impact Statement.
Draft rept.,
Weston W. Wilson, and Paul Seeley. 10 Oct 80, 131p EPA-908/5-80-002A

This Environmental Impact Statement (EIS) evaluates the environmental consequences of alternative methods of wastewater disposal in the outlying areas of Spearfish, South Dakota. This EIS is prepared in response to documented groundwater and surface water pollution problems.

PB81-149072 PC **A04**/MF **A01**
National Oceanic and Atmospheric Administration, Silver Spring, MD. Air Resources Labs.
Fiscal Year 1979 Summary Report of NOAA Meteorology Laboratory Support to the Environmental Protection Agency.
Technical memo.,
Herbert J. Viebrock. Jul 80, 55p NOAA-TM-ERL-ARL-88, NOAA-80110704
Prepared in cooperation with Meteorology Lab., Research Triangle Park, NC.

The Meteorology Laboratory provided research and operational meteorological support to the Environmental Protection Agency. Basic operation support consisted of the application of dispersion models and the conduct of dispersion studies and evaluations. The primary research effort was in the development and evaluation of air quality simulation models using numerical and physical techniques supported by field studies. Work on the description and modeling of the planetary boundary layer continued. Major emphasis was on modeling photochemical oxidant dispersion and dispersion in complex terrain. In addition, climatic studies were conducted, including the analyses of the relationships between pollutant concentrations and meteorological parameters. A first generation ozone forecasting technique was developed.

PB81-149080 PC **A13**/MF **A01**
Maine Univ. at Orono.
The Fishing Ports of Maine and New Hampshire: 1978,
James M. Acheson, Ann W. Acheson, John R. Bort, and Jayne Lello. 1980, 285p NOAA-80110701
Grant NA-79-AA-D-00057

This volume is part of a final report on social science aspects of fisheries management in New England and is divided into three sections. In Section I, general background information is given concerning aspects of the fisheries in northern New England. Included is a history of fishing in the area, general information on the coastal environment and biology of major species caught and a background on fishing boats and gear, marketing and processing, and the legal environment. Section II describes each of the ports in Maine and New Hampshire, as they were in the baseline year of 1978, outlining the physical setting and population, the major industries, general infrastructure, and port infrastructure. Section III describes the local variations in the fishing industry of northern New England. This is done, in the maine, by presenting a statistical summary of the information contained in the port descriptions.

PB81-149569 PC **A03**/MF **A01**
Rijksinstituut voor Drinkwatervoorziening, The Hague (Netherlands).
Health Perspectives in the Oxidative Treatment of Water for Potable Supply,
J. C. Morris. 1979, 46p RID MEDEDELING-79-5
Text in English. Abstract in English and Dutch.

Organic matter is a universal pollutant of terrestrial waters. It is precipitated with rainfall in suspended or dissolved form, it is leached and dispersed from soils during passage of water over or through the ground, it is formed in surface waters as a result of photosynthesis or other biological activity and it is discharged into water as a product of man's domestic and industrial activities. The presence of organic matter always degrades the quality of water for human use. In many instances it imparts adverse hygienic characteristics or even toxic properties to the water, also, it may react with added disinfectants or other treatment agents to give even more noxious side products. Removal of or reduction in content of organic matter is thus an important aspect of water purification for municipal use. Because of the number and variety of organic compounds that may occur in water, effective removal is difficult. A survey of available treatment methods, including storage, infiltration, coagulation, adsorption and oxidation, indicates that no single method is fully satisfactory for all types of organic matter. Consequently, chemical oxidation, along with other techniques, will continue to have a significant role in the purification of drinking water supply.

PB81-149775 PC **A11**/MF **A01**
Parsons, Brinckerhoff, Quade and Douglas, Inc., New York.
Software Maintenance of the Subway Environment Simulation Computer Program.
Final rept. May 76-Oct 78.
Dec 80, 239p DOT-TSC-UMTA-79-31, UMTA-MA-06-0100-79-13
Contract DOT-TSC-1216
See also report dated Oct 75, PB-254 790.Portions of this document are not fully legible.

This document summarizes the software maintenance activities performed to support the Subway Environment Simulation (SES) Computer Program. The SES computer program is a design-oriented analytic tool developed during a recent five-year research project focusing on methods for environmental control in underground rapid transit systems. As discussed in The Subway Environmental Design Handbook, computer simulation was used to overcome the deficiencies of closed-form mathematical modeling, and was validated using scale models and field-testing. The Handbook was developed as a guide and reference for the planning, design, construction, and operation of environmental control systems for underground rapid transit. Shortly after the publication of the Handbook, SES was released to the rail transit community for the purpose of reducing the environmental problems of existing systems, and to help plan facilities and establish standard procedures for improved environmental control in new systems. This report is published in order to aid users of the program in realizing these goals.

PB81-150229 PC **A05**/MF **A01**
Colorado State Univ., Fort Collins. Dept. of Civil Engineering.
Design of Objective Functions for Reservoir Operations.
Masters' thesis,
John Tuman Westgate. 1980, 82p W81-01169, OWRT-B-195-COLO(3)

This research investigates the objective function as a potential weak link in the application of the tools of water resources research to the problems of reservoir operations. Reservoir systems are continually evolving due to changes in the systems' purposes, capabilities, or hydrology. In response to these changes, Reservoir Operations is called upon to evaluate alternative operations policies for their performance on system objectives. Reservoirs often have multiple purposes, and these purposes have multiple performance measures. A catalog of performance measures found in the water resources literature is presented along with a methodology for selecting the performance measures to be used for the objective function of the analysis.

PB81-801938 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sulfate Emissions from Automobiles. 1964-1980 (Citations from the Engineering Index Data Base).
Rept. for 1964-80.
Jan 81, 105p
Supersedes PB80-801921, and NTIS/PS-78/1235.

The cited reports from a worldwide literature survey relates to sulfate exhaust emissions from automobiles. The topics cover the chemistry, the relationship of sulfur oxides and sulfates, control equipment design and effectiveness, and the environmental impacts. (This updated bibliography contains 107 citations, 14 of which are new entries to the previous edition.)

PB81-801979 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Treatment Costs and Economics. 1970-1978 (Citations from the NTIS Data Base).
Rept. for 1970-78.
Dec 80, 192p

This bibliography contains citations on costs and economics of sewage treatment systems, sewers, treatment technology, effluent discharge and sludge disposal. Most studies cover the overall construction and operation costs of sewage treatment plants, whereas others include rate structures, financing, user charges, and benefits of regionalized plants. (This updated bibliography contains 185 citations, none of which are new entries to the previous edition.)

PB81-801987 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sewage Treatment Costs and Economics. 1979-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1979-Nov 80.
Dec 80, 126p
Supersedes PB80-801459, and NTIS/PS-78/1174.

The cited reports of Federally-funded research discuss the costs and economics of sewage treatment systems, sewers, treatment technology, effluent discharge, and sludge disposal. Most studies cover the overall construction and operation costs of sewage treatment plants, whereas others include rate structures, financing, user charges, and benefits of regionalized plants. (This updated bibliography contains 119 citations, 48 of which are new entries to the previous edition.)

PB81-802001 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Effects: General Structures. 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 80.
Jan 81, 366p
Supersedes PB80-801996, and NTIS/PS-78/1210.

Structural domes and shells, cables and electrical wires, chimneys, cooling towers, storage tanks, and antennas exposed to wind pressure are investigated in these reports gathered from a worldwide literature survey. (This updated bibliography contains 359 citations, 74 of which are new entries to the previous edition.)

PB81-802027 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Effects: General Structures. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.
Jan 81, 160p
Supersedes PB80-801970, and NTIS/PS-78/1208.

The effects of wind forces on structural domes, cylinders, ships, towers, antennas, and highway signs are cited in these Government-sponsored research reports. (This updated bibliography contains 153 citations, 24 of which are new entries to the previous edition.)

PB81-802092 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Water Separators. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 177p
Supersedes PB80-801947, and NTIS/PS-78/1257.

Worldwide journal research is cited on these devices, mainly for water pollution control. A range of equipment is described, including gravity separators, centrifuges, membranes, coalescers, filters, distillation columns, and flotation units. Oil recovery from oil spills is covered. Separation of these components in ballast and bilge water, factory effluents, petroleum refineries, and waste oil treatment is studied. Design, operation, costs, testing, and efficiency of these articles are reported. (This updated bibliography contains 170 citations, 38 of which are new entries to the previous edition.)

PB81-802134 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Oil Water Separators. 1964-December, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Dec 80.
Feb 81, 163p
Supersedes PB80-801939, and NTIS/PS-78/1256.

The citations cover Federally-sponsored research on these devices, primarily for oil pollution control. Centrifuge separators, coalescers, filters, and skimmers are included. Oil recovery from oil spills, and separation from ballast and bilge water are also cited. The operation, testing, and performance of this equipment in the laboratory and in the field are reported. (This updated bibliography contains 156 citations, 8 of which are new entries to the previous edition.)

PB81-802191 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Urban Sewage Treatment Planning. October, 1978-December, 1980 (Citations from the NTIS Data Base).
Rept. for Oct 78-Dec 80.
Jan 81, 94p
Supersedes PB80-801038, and NTIS/PS-78/1039. See also 1970-1975, NTIS/PS-77/0887 and 1976-September, 1978, PB80-801020.

The citations cover sewage treatment studies which would be of general interest in urban management and include studies on treatment costs, planning, operations, alternatives, and rates. Reports which discuss current and new processes in a general manner are also included. (This updated bibliography contains 89 citations, 32 of which are new entries to the previous edition.)

PB81-802233 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. November, 1977-1978 (Citations from the Engineering Index Data Base).
Rept. for Nov 77-1978.
Jan 81, 179p

This bibliography contains worldwide citations on fly ash as pertaining to pollution aspects. These studies cover fly ash scrubbing and collection, chemical analysis, utilization, and air pollution control equipment performance. The majority of abstracts deal with electric power plants, fly ash use in cement and roadbeds, and waste disposal. Discussions of metal extraction and recovery from fly ash are included (This updated bibliography contains 171 citations, none of which are new entries to the previous edition.)

PB81-802241 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. 1978-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1978-Nov 80.
Jan 81, 208p

This bibliography contains citations on fly ash generation, collection, disposal, and use. Studies on dust collection devices, filters, precipitators, and scrubbers are included. Additives for fly ash conditioning and combustion modification are studied, as well as fly ash analysis and fly ash related pollution sampling. The use of fly ash in soil stabilization, roads, cements, construction materials, and as absorbents are also covered. (This updated bibliography contains 201 citations, none of which are new entries to the previous edition.)

PB81-802258 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. December, 1979-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 79-Dec 80.
Jan 81, 113p
Supersedes PB80-801830, and NTIS/PS-78/1070. See also 1964-1975, NTIS/PS-77/0922, 1976-1977, PB80-801822, and 1978-November 1979, PB81-802241.

Government-sponsored research on fly ash generation, collection, disposal, and use is cited in the compilation. Studies on dust collection devices, filters, precipitators, and scrubbers are included. Additives for fly ash conditioning and combustion modification are studied, as well as fly ash analysis and fly ash related pollution sampling. The use of fly ash in soil stabilization, roads, cements, construction materials, and as absorbents are also covered. (This updated bibliography contains 105 citations, all of which are new entries to the previous edition.)

PB81-802266 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Fly Ash. 1979-1980 (Citations from the Engineering Index Data Base).
Rept. for 1979-80.
Jan 81, 199p
Supersedes PB80-801848, and NTIS/PS-78/1072. See also 1970-1974, NTIS/PS-76/0718, 1975-October, 1977, NTIS/PS-78/1071, and 1978-November, 1979, PB81-802241.

Worldwide research is cited on fly ash as pertaining to pollution aspects. These studies cover fly ash scrubbing and collection, chemical analysis, utilization, and air pollution control equipment performance. The majority of these abstracts deal with electric power plants, fly ash use in cement and roadbeds, and waste disposal. Discussions of metal extraction and recovery from fly ash are included. (This updated bibliography contains 192 citations, 106 of which are new entries to the previous edition.)

PB81-802498 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Bridges: Construction and Construction Materials. January, 1976-November, 1979 (Citations from the Engineering Index Data Base).
Rept. for Jan 76-Nov 79.
Jan 81, 340p
Supersedes PB80-802291, and NTIS/PS-78/1233.

Bridge design, construction, construction materials, and the structural/mechanical properties are investigated in these reports gathered in a worldwide literature survey. Bridge decks, piers, approaches, and foundations are among the salient features reviewed. (This updated bibliography contains 335 citations, none of which are new entries to the previous edition.)

PB81-802506 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Bridges: Construction and Construction Materials. December 1977-December, 1980 (Citations from the NTIS Data Base).
Rept. for Dec 77-Dec 80.
Jan 81, 295p
Supersedes PB80-802283, and NTIS/PS-78/1232. See also 1964-November, 1975, NTIS/PS-76/1051 and December, 1975-November, 1977, NTIS/PS-78/1231.

Bridge design, construction, construction materials, and the structural/mechanical properties are investigated in these Government-sponsored research reports. Bridge decks, approaches, piers, and foundations are among the salient features reviewed. (This updated bibliography contains 290 citations, 112 of which are new entries to the previous edition.)

PB81-802514 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Bridges: Construction and Construction Materials. December, 1979-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Dec 79-Dec 80.
Jan 81, 81p
Supersedes PB80-802291, and NTIS/PS-78/1233.

Bridge design, construction, construction materials, and the structural/mechanical properties are investigated in these reports gathered in a worldwide literature survey. Bridge decks, piers, approaches, and foundations are among the salient features reviewed. (This updated bibliography contains 76 citations, all of which are new entries to the previous edition.)

PB81-802696 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Air Pollution Sampling of Particles. 1964-January, 1981 (Citations from the NTIS Data Base).
Rept. for 1964-Jan 81.
Jan 81, 174p
Supersedes PB80-802853, and NTIS/PS-78/1171.

This bibliography cites techniques of sampling particles in the earth's atmosphere. Discussed are sampling procedures, sampler design and performance, site selection, sampling networks, and meteorological effects. (This updated bibliography contains 268 citations, 67 of which are new entries to the previous edition.)

PB81-802779 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sanitary Landfills. 1978-1980 (Citations from the Engineering Index Data Base).
Rept. for 1978-80.
Jan 81, 154p
Supersedes PB80-802846, and NTIS/PS-78/1185. See also 1970-1977, PB80-802838.

Citations of worldwide reports on refuse disposal in sanitary landfills are presented. Studies covered are site selection, refuse processing, earth moving equipment, and monitoring. The majority of these abstracts concern water pollution and gas evolution at disposal locations. The recovery of landfill gas for use as a fuel is discussed. Landfill disposal of hazardous materials is excluded. (This updated bibliography contains 110 citations, 61 of which are new entries to the previous edition.)

PB81-802787 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Sanitary Landfills. 1978-1980 (Citations from the NTIS Data Base).
Rept. for 1978-80.
Jan 81, 87p
Supersedes PB80-802820, and NTIS/PS-78/1184. See also 1964-1977, PB80-802812.

The reports cited relate to sanitary landfill criteria design, site selection, guidelines, urban and rural locations, and land reclamation. Research on disposal of municipal refuse, dredge spoil, sewage sludge, and sludges from pollution control in power plants in landfills is covered. Studies on economics, government policies, management, and public health are included. Ground water pollution, land reclamation, gaseous emissions, leachate analyses, landfill liners, esthetics, and monitoring are discussed. Land disposal of hazardous materials is excluded. (This updated bibliography contains 87 citations, 19 of which are new entries to the previous edition.)

PB81-802902 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.

Natural Gas Pipeline Construction. 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Dec 80.
Jan 81, 319p
Supersedes PB80-802069, and NTIS/PS-78/1181.

Construction techniques, materials, and construction difficulties are reviewed in these reports gathered from a worldwide literature survey. Budget costs, safety, and legal aspects are investigated. Problems peculiar to cold weather and underwater construction are considered. (This updated bibliography contains 266 citations, 17 of which are new entries to the previous edition.)

PB81-856429 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Solid Waste Resource Recovery Facilities. January, 1976-November, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Nov 80.
Dec 80, 134p NERACEDBNT2623
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning utilization of solid waste as an engery source. Technical, economic and enviromental impact of the facilities are outlined. Existing facilities are assessed and proposed sites are discussed. (Contains 127 citations, fully indexed and including a table of contents.)

SNV-PM-1253 PC **A04**/MF **A01**
National Swedish Environment Protection Board, Stockholm.
Issues Related to Control of Exhaust Emissions from Automobiles in Sweden.
E. O. Stork. 1979, 72p
U.S. Sales Only.

Sweden should deal separately with the largely-independent questions of the stringency of automotive emission standards and how to assure compliance with standards. The current studies of the need for emission control in Sweden should be completed before emission standards are revised. The current Swedish compliance assurance program is not effective. An alternative approach is needed. The most promising alternative would involve manufacturers having to pay emission fees when mean emissions from classes of their cars in actual use exceed the standards. The compliance of in-use vehicles with emission standards is a difficult problem for which no satisfactory solutions are available. The most promising approach is to require manufacturers to build cars that cannot be easily maladjusted. The Environment Protection Board's resources for the conduct of an automobile emission compliance program are wholly inadequate. If Sweden is to have confidence that it obtains the clean-air benefits for which its citizens pay when they buy new cars, the Board's staff assigned to automotive emission control work needs to be strengthened. (ERA citation 06:005043)

13C. Construction Equipment Materials, and Supplies

PB81-135105 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Crack Control in Concrete Beams by Surface Reinforcement with Glass Fibres.
K. D. Raithby. c1980, 24p TRRL-LR-947
Also pub. as ISSN-0305-1293.

Tests were made on composite reinforced concrete beams incorporating a surface layer of glass reinforced cement (grc) to investigate the effect of local surface reinforcement on serviceability behavior. The grc was in the form of 6 mm thick channel sections moulded into the tension surface of the test beams which were 3.5m long were tested in four-point bending on a simply supported span of 3m. On beams which had been kept dry, the grc surfacing had a significant effect in reducing the size of cracks in the concrete at the design working load but had no effect on deflections; no visible cracks appeared on the surface of the grc until the steel had yielded, at a load well above the design ultimate. Some beams were subjected to artificial aging before test, by immersing them in hot water to represent natural exposure of the grc for periods of up to 30 years. On these beams embrittlement of the grc surfacing rendered it virtually ineffective in controlling cracks in the concrete. The observed behavior compares well with predictions made from a knowledge of the relevant material properties. Considerable improvements in performance could be expected from newer developments in fiber cement composite technology and by using deeper sections for the surface reinforcement. A logical development, which is likely to have economic advantages, is to use suitable sections of rigid fiber reinforced cement sheet as permanent formwork for reinforced concrete members. (Copyright (c) Crown Copyright 1980.)

PB81-138109 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Bitumen from a North Sea Source: Assessment for Road Use,
M. E. Daines. c1980, 11p TRRL-SUPPLEMENTARY-599
Also pub. as ISSN-0305-1315.

Most North Sea crude oils contain little of the heavier fractions and so bitumen used in this country has to be refined from imported crudes. The Claymore field is an exception because it yields a crude oil containing about 19 per cent of bitumen; this is not at present recovered. Tests on this bitumen show that grades suitable for road use could be produced. If circumstances so demanded, a large proportion of UK's estimated consumption of bitumen could be provided from Claymore during the next five years. (Copyright (c) Crown Copyright 1980.)

13D. Containers and Packaging

PB81-142101 PC **A24**/MF **A01**
URS/John A. Blume and Associates, San Francisco, CA.
Seismic Study of Industrial Steel Storage Racks,
C. K. Chen, Roger E. Scholl, and John A. Blume.
Jun 80, 552p NSF/RA-800279
Grant NSF-PFR79-14360

Development of criteria and procedures for the seismic design of industrial steel storage racks is reported. The investigation focused on mathematical models for predicting earthquake response of racks and obtaining experimental data to quantify limit behavior of racks under earthquake conditions. Methodology consisted of subjecting four types of full-scale storage racks to simulated earthquake motions. Full-scale static-cycle tests were performed on two types of racks and antilever and portal tests were conducted on several rack assemblies to obtain information on load deformation characteristics. Shaking table tests were performed to evaluate seismic response effects on different types of merchandise. Table test responses were compared with predicted results using linear and nonlinear mathematical models. Response spectrum and time-history analyses were performed, and simplified static code methods were studied and compared. In general, the racks performed well and predictably during the shaking tests. The ductility and energy dissipation capacity of the racks were much larger in longitudinal than in transverse direction. Responses predicted agreed well with experimental results. Seismic design criteria consistent with the philosophy of the Uniform Building Code were recommended.

13E. Couplings, Fittings, Fasteners, and Joints

AD-A094 219/3 PC **A06**/MF **A01**
Rensselaer Polytechnic Inst., Troy, NY.
Development and Qualification of Methods for the Determination of Diffusible Hydrogen Contents in Weldments.
Interim technical rept. no. 2, 1 Jul 77-30 Jun 80,
W. F. Savage, and E. F. Nippes. 15 Sep 80, 117p
Contract N00014-75-C-0944

Because a critical concentration of diffusible hydrogen must be present for hydrogen-induced cracking, it is essential to determine the amount of hydrogen introduced by various welding procedures. This investigation involved the development and qualification of three methods for the determination of diffusible hydrogen content in weldments. (1) A hot-extraction method utilizing a mass spectrometer: If a suitable quenching procedure were developed, the mass-spectrometer extraction method could be used to measure the diffusible and total hydrogen contents of weld-metal specimens; (2) An electrochemical technique using a modification of the Barnacle Cell: The modified Barnacle Cell cannot be used to determine accurately the diffusible hydrogen content in weldments because accurate diffusivity values are not known, or are difficult to determine; (3) A silicone-oil extraction method developed at RPI: This method is a reliable, rapid and inexpensive technique for the determination of diffusible-hydrogen content in weldments. (Author)

13F. Ground Transportation Equipment

AD-A094 198/9 PC **A06**/MF **A01**
Mare Island Naval Shipyard, Vallejo, CA.
Report on Engineering Investigation of Various Types of Welded Rail Joints,
D. Kelly. Aug 80, 112p

A literature search of current rail joining methods was conducted. In addition, several rail weldments were fabricated and subjected to nondestructive and destructive testing. The purpose was to evaluate rail joining methods for use at Naval facilities as well as to develop a suitable nondestructive test procedure for use on welded rail joints. Bolted rail joints were found to be the least expensive upon initial installation followed by thermite and then flash butt type welded joints (depending on the quantity of joints to be fabricated). Flash butt joints were found to provide the longest service life followed by thermite and then bolted joints. An ultrasonic test procedure and a thermite welding procedure were developed for use with welded rail joints. (Author)

AD-A094 450/4 PC**$15.00**
Army Materials and Mechanics Research Center, Watertown, MA.
Proceedings of Two Symposia on Nondestructive Testing of Tires.
Rept. for Jan 76-May 78,
Paul E. J. Vogel. May 78, 328p Rept nos. AMMRC-SP-78-2, AMMRC-SP-80-1
See also 4 Volume Set, AD-A094 451.

This 2-volume hard-cover set of Symposium Proceedings devoted to Nondestructive Testing of Tires contains the greatest concentration of information on NDT of Tires in the world. Sponsored by the Army Materials and Mechanics Research Center, Watertown, MA, these symposia were held in April 1973, October 1974, January 1976, and May 1978. Each symposia was composed of a general session where papers of general NDT methods were given followed by sessions specializing in the pertinent NDT methods such as radiography, ultrasonics, holography and infrared.

AD-A094 451/2 PC**$25.00**
Army Materials and Mechanics Research Center, Watertown, MA.
Proceedings of Four Symposia on Nondestructive Testing of Tires.
Rept. for 1973-1978,
Paul E. J. Vogel. 25 May 78, 627p NTIAC-74-1, NTIAC-75-1, AMMRC-SP-78-2, AMMRC-SP-80-1
Supersedes AD-785 768 and AD-A038 707.

This four-volume hard-cover set of Symposium Proceedings devoted to Nondestructive Testing of

Tires contains the greatest concentration of information on NDT of Tires in the world. Sponsored by the Army Materials and Mechanics Research Center, Watertown, MA, these symposia were held in April 1973, October 1974, January 1976, and May 1978. Each symposia was composed of a general session where papers of general NDT methods were given followed by sessions specializing in the pertinent NDT methods such as radiography, ultrasonics, holography and infrared. (Author)

PB81-134264 PC **A02**/MF **A01**
Northeastern Forest Experiment Station, Broomall, PA.
Better Load-Weight Distribution Is Needed for Tandem-Axle Logging Trucks.
Forest Service research paper (Final),
John E. Baumgras. 1976, 13p NEFES/81-156, FSRP-NE-342

The results of a logging-truck axle-weight study and recommendations for improving the distribution of load weight on tandem-axle logging trucks. Logging trucks weighed in West Virginia carried so much weight on the rear axles that payloads could not be maximized without exceeding the legal axle-weight limits. Improved weight distribution would enable loggers to increase legal payloads.

PB81-135386 PC **A11**/MF **A01**
Smith (Wilbur) and Associates, Columbia, SC.
Appalachia Railroad Branchline Condition/ Abandonment Study.
Final rept.,
Robert Zuelsdorf, Bob McIlwain, and John White. Nov 80, 235p ARC-78-191/SC-6524
See also PB81-135394.

Rail branchlines in the 13-state area of the Appalachian Regional commission (ARC) vary in traffic carried and therefore in relative profitability. Maintenance is deferred on certain of the less profitable lines which are still important to local economies and could be preserved by appropriate public action. Recommendations were prepared regarding possible ARC roles in this matter. Factors considered included Regional rail demand and commodities carried; the maintenance posture of Regional branchlines (including a physical inspection and individual study of 14 sample lines) and examination of the impact of unit coal train operations on Regional branchline operations. The cost of upgrading Regional branchlines to FRA Class 2 standards (25 mph) was also estimated. The feasibility of improving marginal rail branchlines to FRA Class 2 standards was also examined, based on a sample of such lines. Existing rail assistance programs were also evaluated.

PB81-135394 PC **A08**/MF **A01**
Smith (Wilbur) and Associates, Columbia, SC.
Appalachia Railroad Branchline Condition/ Branchline Study. Appendix Volume.
Final rept.,
Robert Zuelsdorf, Bob McIlwain, and John White. Nov 80, 170p ARC-78-191/SC-6524
See also PB81-135386.

Rail branchlines in the 13-state area of the Appalachian Regional Commission (ARC) vary in traffic carried and therefore in relative profitability. Maintenance is deferred on certain of the less profitable lines which are still important to local economies and could be preserved by appropriate public action. Recommendations were prepared regarding possible ARC roles in this matter.

PB81-138075 PC **A08**/MF **A01**
Automotive Environmental Systems, Inc., Westminister, CA.
Testing of New Technology: Three-Way Catalyst Equipped Vehicles in Los Angeles.
Final rept.,
Alan D. Jones. Aug 80, 164p EPA-460/3-80-027
Contract EPA-68-03-2881

This report presents and summarizes exhaust emissions test data and other related information obtained in the testing and inspection of 116 in-use passenger cars. The test fleet consisted of 1979-1980 automobiles equipped with three-way catalyst emission control systems. The test vehicles were obtained randomly from private owners in the Los Angeles and Orange County areas. The testing was completed August 1980. Each vehicle was tested in as-received condition and given an underhood emissions control component inspection. The test sequence consisted of the 1975 Federal Test Procedure, a Highway Fuel Economy test, a Bagged Idle test, a 50 mph Cruise test, a Four-Speed Idle test and a Loaded Two-Mode test. Twenty-five of the 116 vehicles received an evaporative emissions test using the SHED technique. Nineteen of the 116 vehicles received restorative maintenance repairs and additional testing. Twenty-three of the 116 vehicles were specially selected Cadillacs with four of these undergoing selective malperformance testing.

PB81-142143 PC **A99**/MF **A01**
Automotive Testing Labs., Inc., Aurora, CO.
Study of Emissions from Passenger Cars in Six Cities, FY79. Volume I.
Final rept.
Oct 80, 879p EPA-460/3-80-020A
Contract EPA-68-03-2774
See also Volume 2, PB81-142150.

The standard mass emission test (Federal Test Procedure) was performed for emission factors determination on samples of passenger cars operating in Los Angeles, Houston, Denver, Phoenix, St. Louis and Washington, DC. These samples were also used for obtaining abbreviated emission test (short cycle test), fuel economy test, emission related maintenance and other data. Two-thousand forty-two (2,042) vehicles were tested under the program. The FTP and the Highway Fuel Economy Test were performed on all vehicles at all sites. Some vehicles which exceed Federal standards (excluding the Houston site) were subjected to a restorative maintenance evaluation. The evaluation employed in Los Angeles was designed to address three-way catalyst technology. Some vehicles in all but the Los Angeles site were used to evaluate commercial repair facility performance in relation to idle speed and mixture adjustments. Other actions were taken in relation to each vehicle tested. These included an emission control system maladjustment/disablement and status inspection driveability evaluations and owner interviews to obtain vehicle maintenance and usage data.

PB81-142150 PC **A99**/MF **A01**
Automotive Testing Labs., Inc., Aurora, CO.
Study of Emissions from Passenger Cars in Six Cities, FY79. Volume II.
Final rept.
Oct 80, 899p EPA-460/3-80-020B
Contract EPA-68-03-2774
See also Volume 1, PB81-142143.

The standard mass emission test (Federal Test Procedure) was performed for emission factors determination on samples of passenger cars operating in Los Angeles, Houston, Denver, Phoenix, St. Louis and Washington, DC. These samples were also used for obtaining abbreviated emission test (short cycle test), fuel economy test, emission related maintenance and other data.

PB81-143315 PC **A10**/MF **A01**
Pacific Consultants, Boston, MA.
Proceedings of the Workshop for Classification Yard Technology, Held in Chicago, Illinois on October 30-31, 1979. A Status Report on Yard Research.
Final rept.,
Ellen S. Witt, and Norka Sheldiock. Dec 80, 209p PC-DOT-01, FRA/ORD-80/17
Contract DOT-FRA-9126

The Classification Yard Technology Workshop was sponsored by the Federal Railroad Administration (FRA) to present the results of current yard research under the Railroad Operational Improvements Program. The major program objectives are the development of technologies, quantification of areas for improvement, evaluation of components and systems, and improvement of effectiveness of railroad communication and control systems. These proceedings include the technical papers, responses to the workshop questionnaire, and comments of conference participants and panel members of the following areas of research: Yard Design Methods, New Concepts in Car Speed Control, Improvements for Car Presence Detection, Measurements of Rolling Resistance, Electromagnetic Compatibility, and Yard Computer Systems.

PB81-144040 PC **A03**/MF **A01**
Hercules, Inc., Magna, UT. Bacchus Works.
Hybrid Materials Substitution for Oldsmobile Omega X-Body Components.
Final rept. Jan-Apr 80,
Stan Cross. Nov 80, 38p DOT-TSC-NHTSA-80-27, DOT-HS-805 551

This report provides an evaluation of the potential of weight savings for a 1980 General Motors X-body car through the substitution of lightweight composite materials for presently used metal materials. A total of 75 components of this vehicle are considered for substitution of lightweight materials. Based on equal stiffness for material substitution, analysis shows 495 pounds can be removed from this X-body car.

PB81-144388 PC **A04**/MF **A01**
Chilton Co., Radnor, PA.
Light Truck Characteristics, Historical Data Base.
Final rept. Oct 77-Jun 78,
C. Cantwell. Nov 80, 65p DOT-TSC-NHTSA-80-22, DOT-HS-805 482
Contract DOT-TSC-1463
See also report dated Dec 79, PB80-145220.

The report is a description of the data about the physical, operating performance, and market characteristics of light trucks for the model years 1955 through 1977, which is stored on tape in DOT/TSC DEC System 10 computer system. Vehicles are reported by model year and grouped by manufacturer, using production volume, model, body type, engine displacement, transmission and GVWR class attributes as criteria to select representative vehicle configurations. Characteristics are documented for vehicles representative of total U.S. sales of domestic and imported light trucks for the model years indicated.

PB81-145880 PC **A07**/MF **A01**
EG and G Automotive Research, Inc., San Antonio, TX.
Procurement and Emissions Testing of 1969 and 1972/73 Model Year Gasoline Powered Light Duty Trucks, (6001-8500 lbs. GVWR).
Final rept. 26 Jul 78-26 May 80,
L. Kevin Kott, Albert Naegelin, and Jerry Wallingford. Jun 80, 128p EPA-460/3-80-011
Contract EPA-68-03-2683

Twenty-three 1969 and twenty-five 1972/73 in-use light duty trucks were obtained from the public, 'tuned-up' according to manufacturer's specifications and tested for exhaust emissions utilizing the Federal Test Procedure. Triplicate FTP test data are presented along with duplicate Tests of idle emissions for each vehicle. Eighteen engines were removed from procured vehicles and shipped to EPA for engine dynamometer testing.

PB81-147332 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Measurement Lab.
Examination of Distance Measuring Devices.
Final rept.,
Stephen Hasko. Dec 80, 66p NBS-HB-137
Library of Congress catalog card no. 80-600182.

This is a manual for State and local weights and measures officials, describing distance measuring devices such as odometers and taximeters to be tested, testing equipment and its calibration, inspection and testing procedures, and a reporting system. Provision is made for accommodating a changeover to metric units of device examination in the definitions, tables, procedures, and in reporting a test.

PB81-856387 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Railroad Ties. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 69p NERACUSGNT2455
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover rail system investment analysis and evolution of track rehabilitation, test procedures and results of tests on the physical properties of rail concrete ties, jointbars, and fasteners, track and bridge maintenance, standards and specifications for railroad or mass transit ties, problems and needs in track structure design and analysis, evaluation of performance for cross ties and fasteners, and the economics of concrete and wood railroad ties. (Contains 58 citations, fully indexed and including a table of contents.)

13H. Industrial Processes

AD-A094 204/5 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Economic Gazette (Selected Articles),
A. Kablukovskiy. 5 Dec 80, 11p Rept no. FTD-ID(RS)T-1512-80
Edited trans. of mono. from Ekonomicheskaya Gazeta n.p., 1964 p15, by Roger T. Crozier.

No abstract available.

AD-A094 242/5 PC **A05**/MF **A01**
San Fernando Labs., Pacoima, CA.
Investigation of CNTD Mechanism and Its Effect on Microstructural Properties.
Final rept. 20 Sep 78-20 Sep 79,
Deepak G. Bhat. Oct 80, 89p
Contract N00019-78-C-0557

This report presents results of a research program in which we sought to develop a chemical vapor deposition (CVD) method for the deposition of extremely fine grained silicon nitride. The program consisted of three separate technical efforts. The first effort, a parametric study of the conventional silicon tetrahalide-ammonia CVD chemistry, produced no significant grain refinement in the Si3N4 deposits. The second effort attempted, with no success, to utilize silicon halide disproportionation chemistry in the CVD process. Finally, we observed an apparently successful Si3N4 grain refinement during the third effort in which we used the competing codeposition of separate phases to interrupt grain growth. During this effort, we tried the codeposition of silicon nitride and silicon carbide with no success. However, we found apparently good results when silicon nitride was codeposited with aluminum nitride. (Author)

AD-A094 286/2 PC **A04**/MF **A01**
Stanford Univ., CA.
Models of Fabrication Processes, Devices, Circuits, and Systems for Computer-Aided Design of VLSI.
Semi-annual technical status rept. 15 Feb-15 Aug 79,
James D. Plummer. 15 Aug 79, 57p
Contract MDA903-79-C-0257, ARPA Order-3709

This report covers the technical progress of the program over the six-month period, February 15, 1979 to August 15, 1979. Its organization corresponds to that of the contract proposal with sections devoted to Thermal Oxidation, Ion Implantation, Chemical Vapor Deposition of Silicon, Materials Analysis and Interface Physics, and Complete Process and Device Simulation. Each section contains a description of progress made, including difficulties encountered, results obtained with their supporting data, and brief plans for the future. (Author)

AD-A094 306/8 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Laser Annealing of Refractory OHMIC Contracts to GaAs.
Memorandum rept.,
J. F. Giuliani, W. T. Anderson, Jr., A. Christou, and H. B. Dietrich. 5 Feb 81, 10p Rept no. NRL-MR-4439

Laser annealing has been successfully applied in producing low resistance ohmic contact to GaAs using refractory metallizations. These alloy systems include TiW, Ta, Mo, and Ni deposited on epitaxial Ge layers grown on (100) n-type GaAs substrates. In some cases an N+ layer obtained by ion implantation was present at the GaAs surface. Ohmic contact resistances of 1-5 X .0000001 omega-sq cm have been produced by laser annealing. These values compare favorably with the results obtained by thermal annealing. The refractory ohmic contacts reported here are intended to improve the reliability of devices operated under high-temperature and/or high-power conditions.

AD-A094 578/2 PC **A05**/MF **A01**
Army Procurement Research Office, Fort Lee, VA.
Production Rate and Weapon System Cost: Research Review, Case Studies, and Planning Model.
Final rept.,
Charles H. Smith. Nov 80, 81p Rept no. APRO-80-05

Recent experience has shown that production rates for weapons systems are subject to continual adjustment. Parametric cost estimates have usually depended on physical parameters and on cumulative quantity, but not on rate. This study consists of three parts-a review of existing research, a number of case studies, and a suggested cost model for estimating the cost impact of production rate changes. The conclusions that could be drawn from existing research were seen to be quite limited. No cost models were found that seemed suitable for use by budget planners in evaluating production rate effects. The case studies gave further insight into the factors having the greatest cost impact under rate changes. The cases supported the belief that the most important contributor to increased unit costs under stretchout is an increased overhead allocation and that labor inefficiences are usually of minor significance. The proposed cost model derives from a non-linear variation of cost-volume-profit analysis and is consistent with the principal empirical findings. (Author)

PATENT-4 231 058 Not available NTIS
Department of the Navy, Washington, DC.
Tungsten-Titanium-Chromium/-Gold Semiconductor Metallization.
Patent,
K. Reed Gleason. Filed 22 Nov 78, patented 28 Oct 80, 4p AD-D008 034/1, PAT-APPL-963 067
Supersedes PAT-APPL-963 067-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Improved TRAPATT diodes in which the improvement comprises a high-temperature metallization on silicon from which the diodes are formed. Metallization is applied to a silicon wafer by sputtering a layer of titanium, chromium, tungsten alloy followed by a gold layer. The desired diode shape and size is defined in the gold layer by use of a pattern of the proper shape and size in combination with a photolithographic process. The metallization layers and the silicon are then etched so as to form a plurality of individual shaped (mesa or ring structure) TRAPATT diodes. Such diodes can withstand 610 deg C for one hour without degradation. (author)

PB81-145179 PC **A08**/MF **A01**
Indian Lead Zinc Information Centre, New Delhi.
Computer Aids for the Die Caster.
1980, 152p
Prepared in cooperation with Diecasting Society of India, New Delhi.

A computer program is described which will enable a die caster to design the metal flow system for a die within a matter of minutes, and to do this simply and more accurately than was ever possible previously. This manual describes the computer program and how to use it.

PB81-856288 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Copper. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 92p NERACUSGNT2403
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of copper. Included are topics such as plating bath composition, optimum operating conditions, and maintenance of plating baths. Particular emphasis is placed on the disposal and treatment of plating bath waste and recovery of metals. (Contains 80 citations, fully indexed and including a table of contents.)

PB81-856296 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Copper. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 70p NERACEDBNT2403
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of copper. Included are topics such as plating bath composition, optimum operating conditions, and maintenance of plating baths. Particular emphasis is placed on the disposal and treatment of plating bath waste and recovery of metals. (Contains 56 citations, fully indexed and including a table of contents.)

PB81-856304 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Copper. January, 1976-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 148p NERACEI NT2403
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of copper. Included are topics such as plating bath composition, optimum operating conditions, and maintenance of plating baths. Particular emphasis is placed on the disposal and treatment of plating bath waste and recovery of metals. (Contains 154 citations, fully indexed and including a table of contents.)

PB81-856312 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Zinc. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 84p NERACEI NT2404
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of zinc. Included are topics such as plating bath composition, optimum operating conditions, and maintenance of plating baths. Particular emphasis is placed on the disposal and treatment of plating bath waste and recovery of metals. (Contains 88 citations, fully indexed and including a table of contents.)

PB81-856320 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Chromium. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 88p NERACUSGNT2409
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of chromium. Included are topics such as plating bath compositions, optimum operating conditions, and maintenance of plating baths. Particular emphasis is placed on the disposal and treatment of plating bath waste and recovery of metal. (Contains 69 citations, fully indexed and including a table of contents.)

PB81-856338 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.

Electroplating of Chromium. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 77p NERACEI NT2409
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of chromium. Included are topics such as plating bath compositions, optimum operating conditions, and maintance of plating baths. Particular emphasis is placed on the disposal and treatment of plating bath waste and recovery of metal. (Contains 79 citations, fully indexed and including a table of contents.)

PB81-856346 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Cadmium. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 57p NERACEDBNT2410
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of cadmium. Included are papers on plating bath compositions, operating conditions and methods of bath analysis. Also included are papers on plating bath waste disposal and pollution control. Of special interest are papers on cadmium isotopic targets and corrosion resistant coatings for uranium and uranium alloys. (Contains 51 citations, fully indexed and including a table of contents.)

PB81-856932 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Zinc. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Dec 80, 135p NERACASMNT2404
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning zinc electroplating on a wide variety of substrates. Information on plating bath compositions, operating parameters such as current density, temperature, and the preparation of the substrate surface are included. (Contains 225 citations, fully indexed and including a table of contents.)

PB81-856957 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Cadmium. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Dec 80, 80p NERACASMNT2410
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citation concerning cadmium and cadmium alloy electroplating on a wide variety of substrates. Information on plating bath compositions, operating parameters such as current density, temperature, and preparation of the substrate surface are included. Methods for plating waste disposal are also revieved. No abstracts are provided prior to 1978. (Contains 124 citations, fully indexed and including a table of contents.)

PB81-857187 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electroplating of Tin. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Dec 80, 73p NERACASMNT2745
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography cites research reports relating to electroplating of tin and tin alloys, and includes the compositions and operating parameters required to produce tin coatings on a wide variety of substrates. No abstracts are provided prior to 1978. (Contains 113 citations, fully indexed and including a table of contents.)

PB81-857286 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrodepositon of Precious Metals. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 84p NERACASMNT2832
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on precious metal electrodeposition with the exception of gold and silver. Alloy plating of these metals is also included. (Contains 146 citations, fully indexed and including a table of contents.)

PB81-857294 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrodeposition of Cobalt Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 73p NERACASMNT2833
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of cobalt base alloys. Topics range from plating bath composition and operating parameters to properties of the electrodeposited coatings as a fucntion of the metal substrate. (Contains 107 citations, fully indexed and including a table of contents.)

PB81-857302 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrodeposition of Copper Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 63p NERACASMNT2835
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of copper base alloys. Topics range from plating bath compositions and operating parameters, to properties of the electrodeposited coatings as a function of the metal substrate. (Contains 89 citations, fully indexed and including a table of contents.)

PB81-857310 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrodepositon of Zinc Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 55p NERACASMNT2836
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of zinc base alloys. Topics range from plating bath compositions and operating parameters to properties of the electrodeposited coatings as a function of the metal substrate. (Contains 78 citations, fully indexed and including a table of contents.)

PB81-857328 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrodeposition of Tin Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 51p NERACASMNT2837
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of tin base alloys. Topics range from plating bath compostions and operating parameters to properties of the electrodeposited coatings as a function of the metal substrate. (Contains 70 citations, fully indexed and including a table of contents.)

PB81-857336 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Electrodeposition of Nickel Base Alloys. January, 1966-December, 1980 (Citations from the Metals Abstracts Data Base).
Rept. for Jan 66-Dec 80.
Jan 81, 135p NERACASMNT2840
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations on the electrodeposition of nickel base alloys. Topics range from plating bath compositions and operating parameters to properties of the electrodeposited coatings as a function of the metal substrate. (Contains 218 citations, fully indexed and including a table of contents.)

13I. Machinery and Tools

AD-A094 030/4 PC **A04**/MF **A01**
SKF Technology Services, King of Prussia, PA.
Establishment of Engineering Design Data for Hybrid Steel/Ceramic Ball Bearings. Phase II.
Final rept. Aug 79-Aug 80,
F. R. Morrison, and T. Yonushonis. 26 Sep 80, 60p Rept no. SKF-AT80T042
Contract N00019-79-C-0418

A lot of hybrid ceramic/steel angular contact ball bearings was fabricated to a design optimized for operation at 2.5 x 10 to the 6th power dN. Life tests were conducted on these bearings at low speed, 0.4 x 10 to the 6th power dN, using two load levels which produced maximum Hertz stress levels of 2.0 GPa and 2.4 GPa respectively. A detailed failure analysis was completed to define the causes of the relatively early ball failures experienced at the high load and verify the good performance achieved at the low load. (Author)

AD-A094 087/4 MF **A01**
Shaker Research Corp., Ballston Lake, NY.
Rotor-Bearing Dynamics Technology Design Guide. Part VIII. A Computerized Data Retrieval System for Fluid Film Bearings.
Interim rept. Mar 79-Mar 80,
C. H. T. Pan, B. F. Geren, J. A. Bartlett, and S. Fiedler. Oct 80, 250p SRC-79-TR-46, AFAPL-TR-78-6-PT-8
Contract F33615-76-C-2038
See also Part 7, AD-A080 562 and Part 6, AD-A094 167.
Availability: Microfiche copies only.

This report describes a computerized data storage retrieval system for the static and dynamic characteristics of fluid film bearings. The procedure combines asymptotic power law extrapolation outside the stored data range with smooth interpolation within the data table. Thirty-one data tables have been prepared and installed in the system. The procedure allows addition of new data tables in the future. The retrieval software allows the user to list the data content in either the dimensional or the dimensionless form or to generate data lines in the sequence and format directly usable as input to the rotordynamics software described. Inertia, compliance and damping effects of the pedestal can be included in the retrieval dynamic characteristics of each bearing.

AD-A094 167/4 PC **A06**/MF **A01**
Shaker Research Corp., Ballston Lake, NY.
Rotor-Bearing Dynamics Technology Design Guide. Part VI. Status of Gas Bearing Technology Applicable to Aero Propulsion Machinery.
Interim rept. Jan-May 80,
Coda H. T. Pan. Oct 80, 107p SRC-80-TR-57, AFAPL-TR-78-6-PT-6
Contract F33615-76-C-2038
See also Part 7, AD-A080 562.

This report reviews gas lubrication technology as applicable to the support of aero propulsion equip-

ment. It contains a historical sketch of the evolution of the field, a review of relevant fundamentals, a discussion of the whirl stability phenomena, the design of thrust bearings for turbomachines, a brief report on the current state of materials development, and a general review of gas lubricated compliant bearings. (Author)

PAT-APPL-6-192 406 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Dynamic Damping System.
Patent Application,
Charles F. Grove. Filed 30 Sep 80, 17p AD-D008 048/1
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A dynamic damping system for stabilizing the motion of a large object with respect to inertial space by adding mechanical damping to an angular positioning servo system for the object. The mechanical damping is achieved by a dynamic damper assembly which attaches to an inertial balancer that provides inertia feedback to the servo system. The dynamic damper assembly along with the inertia balancer mechanically assist the positioning servo system. (Author)

PAT-APPL-6-195 693 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Flat Workpiece Pickup.
Patent Application,
Gerald E. Ennis. Filed 9 Oct 80, 10p AD-D008 045/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention is concerned with providing a technique for picking up a flat workpiece from a flat surface by an industrial robot where vacuum or magnetic devices are not applicable. The workpiece is placed upon a table having a compliant surface formed of a plurality of vertical upstanding closely spaced bristle-like elements with the free upper ends providing a support surface for the workpiece. The compliant surface allows a tined end-effector or hand of the industrial robot to plunge into the brush-like surface and under the workpiece to lift and transport it to another location without disturbing the original orientation. Accordingly, it is an object of the invention to provide a flat workpiece pickup wherein a minimum of hardware is required and no vacuum or magnetic devices are applicable. Another object of the invention is to provide a technique for picking up a flat workpiece from a flat surface wherein the workpiece is lifted off the surface without disturbing the original orientation. Still another object of the invention is to provide a flat workpiece pickup from a flat surface wherein the work surface is compliant and includes a plurality of vertical, closely spaced upstanding bristle-like elements. A further object of the invention is to provide a compliant work surface for holding a flat workpiece for pickup by a robot wherein the compliant surface is arranged to bend and/or part to allow a tined end-effector to penetrate the work surface holding the workpiece.

PATENT-4 218 941 Not available NTIS
National Aeronautics and Space Administration, Hampton, VA. Langley Research Center.
Method and Tool for Machining a Transverse Slot About a Bore.
Patent,
M. A. David-malig. Filed 17 Oct 78, patented 26 Aug 80, 6p N81-14319/0, PAT-APPL-953 314 Supersedes PAT-APPL-953 314-78, N79-11249 (17 - 02, p. 0168). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method and apparatus for cutting a transverse slot about a bore of smaller diameter than that of the slot are disclosed. The invention consists of introducing a cutting head facing transversely to the bore, through the bore opening its distance from the mill shaft being progressively extended by the addition of spacers between the head and the shaft until the desired slot depth is obtained. The spacers are held in position by a cable passing from the cutting head through the series of spacers and out along the mill shaft. The mill shaft carrying the cutting head is moved transversely into the object wherein the slot is being cut as the object is being rotated thereabout by the mill table to which it is affixed.

PB81-802563 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Liquid Bearings. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 100p
Supersedes PB80-802606, and NTIS/PS-78/1281.

Design and performance of hydrostatic and hydrodynamic bearings are investigated in these Government-sponsored research reports. Wear resistance, lubrication effectiveness, and performance in liquid environments are among the parameters reviewed. Cryogenic and liquid metal environments are included. (This updated bibliography contains 95 citations, 1 of which is a new entry to the previous edition.)

PB81-802571 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Liquid Bearings. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 176p
Supersedes PB80-802614, and NTIS/PS-78/1282.

Design and performance of hydrostatic and hydrodynamic bearings are investigated in these reports gathered in a worldwide literature survey. Wear resistance, lubrication effectiveness, and performance in cryogenic and liquid metal environments are among the parameters reviewed. (This updated bibliography contains 170 citations, 28 of which are new entries to the previous edition.)

PB81-802589 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Journal Bearings. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 180p
Supersedes PB80-802515, and NTIS/PS-78/1279.

Design and performance of journal bearings are discussed in these Government-sponsored research reports. Operation in diversified environments such as liquid metals and gases is investigated. (This updated bibliography contains 175 citations, 3 of which are new entries to the previous edition.)

PB81-802597 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Journal Bearings. November, 1976-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Nov 76-Dec 80.
Jan 81, 248p
Supersedes PB80-802523, and NTIS/PS-78/1280. See also 1970-October, 1976, NTIS/PS-77/1127.

Design and performance of journal bearings are discussed in these reports gathered from a worldwide literature survey. Lubrication, hydrodynamics, and thermodynamics of various geometric configurations are reviewed. (This updated bibliography contains 243 citations, 74 of which are new entries to the previous edition.)

PB81-802647 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Thrust, Sleeve, and Jewel Bearings. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 145p
Supersedes PB80-802622, and NTIS/PS-78/1286.

Design and performance of thrust, sleeve, and jewel bearings are reviewed in these Government-sponsored research reports. Lubrication effects, torque effects, bearing hydrodynamics, and bearing physical properties are among the parameters investigated. (This updated bibliography contains 140 citations, 6 of which are new entries to the previous edition.)

PB81-802654 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Thrust, Sleeve, and Jewel Bearings. 1974-1980 (Citations from the Engineering Index Data Base).
Rept. for 1974-80.
Jan 81, 320p
Supersedes PB80-802630, and NTIS/PS-78/1287. See also 1970-1973, NTIS/PS-76/0954.

Design and performance of thrust, sleeve, and jewel bearings are reviewed in these reports gathered in a worldwide literature survey. Lubrication effects, torque effects, bearing hydrodynamics, and bearing physical properties are among the parameters investigated. (This updated bibliography contains 305 citations, 45 of which are new entries to the previous edition.)

PB81-802662 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Gas Bearings. 1970-1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-80.
Jan 81, 345p
Supersedes PB80-802507, and NTIS/PS-78/1278.

The design, performance, and applications of gas bearings are investigated in these reports gathered in a worldwide literature survey. Gas bearing configuration, gas flow, lubrication, bearing load, and bearing stability are among the parameters reviewed. (This updated bibliography contains 340 citations, 19 of which are new entries to the previous edition.)

PB81-802670 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Gas Bearing. 1971-1980 (Citations from the NTIS Data Base).
Rept. for 1971-80.
Jan 81, 296p
Supersedes PB80-802499, and NTIS/PS-78/1277. See also Volume 1, 1964-1970, NTIS/PS-76/0969.

The design, performance, and applications of gas bearings are investigated in these Government-sponsored research reports. Gas bearing configuration, gas flow, lubrication, bearing loading, and bearing stability are among the parameters reviewed. (This updated bibliography contains 292 citations, 13 of which are new entries to the previous edition.)

13J. Marine Engineering

AD-A094 129/4 PC **A07**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Proceedings of the Workshop on Ship Wave-Resistance Computations Held at Bethesda, Maryland on 13-14 November 1979. Volume I,
Kwang June Bai, and Justin H. McCarthy. 1979, 135p
Errata sheet inserted. See also Volume 2, AD-A094 130.

The purpose of this Workshop is to evaluate existing computational methods for predicting the wave resistance, local flow fields, and wave patterns of ships advancing at constant speed in calm water. The focus is on the numerical predictions, per se, which will be compared with each other and with applicable experimental data for a number of hulls and Froude numbers which have been specified in advance to all participants. This focus is narrower in scope than the earlier, very important International Seminars on Ship Wave Resistance held at

Ann Arbor in 1963 and Tokyo in 1976, and the International Conferences on Numerical Ship Hydrodynamics held at Gaithersburg in 1975 and Berkeley in 1977. In these meetings the emphasis was at least as much on the methods as on the numerical results, and common sets of hulls and data were not prescribed. It is our hope that the Workshop will establish a picture of the state-of-the-art of potential flow predictions of ship wave resistance and help to identify the needs for future research. To these ends the meeting has succeeded in bringing together a very large number of the world's leading researchers in wave resistance analysis. We are very grateful. (Author)

AD-A094 130/2 PC **A19**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD.
Proceedings of the Workshop on Ship Wave-Resistance Computations Held at Bethesda, Maryland on 13-14 November 1979. Volume II,
Kwang June Bai, and Justin H. McCarthy. 1979, 429p
See also Volume 1, AD-A094 129.

Partial Contents: Calculation of the Wave Resistance of Ships by the Numerical Solution of Neumann-Kelvin Problem and by Using a Singularity Method; Wave Resistance Calculation for Wigley, Inui Hull S-201 and Series 60 Hulls; Calculations with the XYZ Free Surface Program for Five Ship Models; Calculation of Ship Wave Resistance with Special Reference Sinkage; Computations of Wave-Resistance by the Low Speed Theory Imposing Accurate Hull Surface Condition; Simple Calculation of Sheltering Effect on Wave Resistance of Low Speed Ships; Second Order Wave Resistance; Wave Resistance of the Wigley and Inui Hull Forms Predicted by Two Simple Slender-Ship Wave-Resistance Formulas; Numerical Calculation of Second-Order Wave Resistance Using Lagrangian Coordinates; Wave-Resistance of Double Model in Finite Depth and Its Application to Hull Form Design; Computations by Finite Element Method; Wave Resistance in a Restricted Water by the Localized Finite Element Method; Nonlinear Calculations of Three-Dimensional Potential Flow about a Ship; Guilloton's Method; Calculation of Ship Wave Resistance Using a Surface Source Distribution; Computation by Numerical Far-Field Wave Survey Data; Calculation of Ship Wave Resistance Including the Effects of Boundary Layer and Wake; and Wave Making Resistance of the Model Series 60 '4210W' by Regression Analysis.

AD-A094 249/0 PC **A05**/MF **A01**
Arizona Univ., Tucson. Engineering Experiment Station.
Convective Heat Transfer for Ship Propulsion.
Annual summary rept. no. 5, 1 Apr 78-14 Jan 80,
Scott E. Faas, and D. M. McEligot. 30 Jan 80, 99p Rept no. 1248-7
Contract N00014-75-C-0694

As duct configurations of interest in heat exchanger designs and other components in propulsion systems, a corrugated duct and a parallel plate duct with repeated rib roughness were selected for numerical modeling. For the rough duct, the flow field and the temperature distribution in both the fluid and in the solid plate were obtained. Results for the corrugated duct reveal the presence of large recirculating zones at Reynolds numbers greater than about 50. The friction factor passes through a minimum as the Reynolds number is increased and then approaches an approximately constant value corresponding to the development of the recirculation zones. (Author)

AD-A094 265/6 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
The NRL Unmanned Free-Swimming Submersible (UFSS).
Final rept. 1975-1980,
Perry B. Alers, and Herbert A. Johnson. 31 Dec 80, 51p Rept no. NRL-8459

The Unmanned Free-Swimming Submersible (UFSS) vehicle was designed and built at NRL in order to demonstrate and evaluate advanced technologies as applied to underwater vehicles. A review is given of the features of the various subsystems used in the vehicle as well as the tradeoffs considered in their initial design. A report is also given of a series of preliminary tests carried out at Solomons, Maryland, and recommendations are made for further testing at sea. Finally, a set of applications which are of near-term interest to the Navy is briefly reviewed. (Author)

AD-A094 336/5 PC **A03**/MF **A01**
System Planning Corp., Arlington, VA.
An Assessment of Small Submarines and Encapsulation of Ballistic Missiles--Phase II Survey.
Final rept.
Nov 80, 36p Rept no. SPC-648
Contract N00014-79-C-0304
See also Phase I, Volumes 1-3, AD-C021 670-AD-C021 672.

A survey of previous studies on missile encapsulation was conducted. Based upon the results of this survey, it was concluded that a Phase II study effort as originally specified in the study directive is not warranted.

AD-A094 341/5 PC **A05**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
An Analysis of the Propulsion Experiments Performed on a Model Representing the Stretched PONCE DE LEON (SPDL) Class RO/RO Ship Fitted with Two Sets of Design Contrarotating Propellers (Model 5362; Propellers 4731 & 4732 and 9019 & 9020).
Final rept.,
Steven C. Fisher. Jan 81, 92p Rept no. DTNSRDC/SPD-141-19

A series of propulsion experiments were performed on Model 5362, representing a Stretched PONCE DE LEON Class RO/RO ship. The model was fitted with two sets of design contrarotating propellers. The results of the propulsion experiments indicate that the ship when equipped with either set of contrarotating propellers should achieve design speed with 12-13% less power than when fitted with the design single screw propeller. The methods used in analyzing the data are discussed. (Author)

AD-A094 342/3 PC **A09**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Analysis of Wake Survey Experimental Data for Model 5365 Representing the R/V ATHENA with and without the Bass Dynamometer Boat.
Final rept.,
Rae B. Hurwitz, and L. Bruce Crook. Jan 81, 189p Rept no. DTNSRDC/SPD-0833-06

This report describes a series of model experiments conducted as part of the overall project of the David Taylor Naval Ship Research and Development Center (DTNSRDC) to adapt controllable pitch propellers to the needs of high speed combatant ships. The first set of experiments was conducted on a model of the R/V ATHENA with and without the port propeller operating. The second set repeated the first, except that the Bass Dynamometer Boat was mounted aft of the model. The third set was a series of idealized wake distribution experiments, in which the model was removed and the pitot rake was mounted upstream of the Bass Boat. The effect of an operating port propeller on the mean starboard wake distribution and the harmonic content of the wake was small. The presence of the Bass Boat behind the ATHENA model, however, affects both the mean values and the harmonic content of the wake. Finally, one idealized mean wake distribution was shown to be weakly dependent on speed, and the harmonic content of wakes at two different speeds differed by less than three percent. (Author)

AD-A094 378/7 PC **A08**/MF **A01**
David W. Taylor Naval Ship Research and Development Center, Bethesda, MD. Ship Performance Dept.
Propeller-Disk Wake Survey Data for Model 4989 Representing the FF 1052 Class Ship in a Turn and With a Bass Dynamometer Boat,
William G. Day, Jr., and Rae B. Hurwitz. Dec 80, 167p Rept no. DTNSRDC/SPD-0011-21

Experiments are described in which the wake in way of the propeller disk was determined for several conditions on a model of the FF 1052 Class ship in connection with an investigation to determine blade loadings on a controllable pitch propeller. The wake surveys were conducted with and without a dynamometer boat behind the hull model to determine the effects of the presence of the dynamometer boat on the flow through the propeller disk of the model. Next, wake data were obtained for the model in several conditions while turning in the Rotating Army Facility. Finally, the model was towed in a straight line with a yaw angle corresponding to that used in the turning experiments to assess the differences in results for these two techniques.

AD-A094 596/4 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
A Microprocessor Managed Shipboard Tank Level Indicator System.
Master's thesis,
Joseph C. Rieth, Jr. Sep 80, 111p

A solid state, microprocessor managed, tank level indicator (TLI) system for shipboard applications is presented. The system derives tank level information from a capacitance meter whose output is processed by an INTEL 8085 based microcomputer. The system's stored program provides time averaging and interpolation functions which compensate for non uniform tank profiles, as well as roll and pitch movement, of the vessel. The stored program may be installed in programmable read only memory by a stand alone program transfer device (PTD) which was designed to facilitate use of a microprocessor development system, such as the Tektronics 8002A with high level language compiler, as a software design tool, thus extending the capabilities of the system in use at the Naval Postgraduate School. The TLI system may easily be expanded to service the full array of tanks in a typical vessel and to provide a variety of functions not implemented in the prototype. (Author)

PB81-135204 PC **A10**/MF **A01**
Texas A and M Univ., College Station. Ocean Engineering Program.
A Nonlinear Analysis of Liquid Sloshing in Rigid Containers.
Final rept.,
Y. K. Lou, T. C. Su, and John E. Flipse. Aug 80, 220p COE-241, TAMU-FE-4084, MA-RD-940-80092
Contract MA-79-SAC-B0018

Liquid sloshing in a tank is essentially a nonlinear phenomenon. When the amplitude of tank oscillation is large, two types of nonlinearities are present. One occurs at the free surface due to large fluid motion. The other occurs at the fluid-tank interface. Both of these nonlinearities must be taken into account for a satisfactory analytical treatment. A literature review reveals that only the free surface nonlinearity has been accounted for in previous studies. Hence, these studies are only valid for small tank oscillations and thus have limited applications. Two nonlinear theories have been developed in the present study in which the effects of large tank motions on liquid sloshing are properly accounted for. One theory is applicable for the near resonance oscillations while the other is valid when the tank is oscillating at a frequency away from resonance. In addition to the analytical work, limited experimental studies have also been conducted. Comparisons of the analytical and experimental results are generally very good.

PB81-142341 PC **A03**/MF **A01**
Manalytics, Inc., San Francisco, CA.
Rationalization of Liner Service, United States Atlantic and Gulf Ports to Northern Europe. Volume I: Executive Summary.
Final rept.
Dec 80, 29p FMC-RD-81001A
Contract BI-FMC-79-3
See also Volume 2, PB81-142358.
Also available in set of 5 reports PC E14, PB81-142333.

The report is a 5 volume work and presents the results of an analysis of alternative approaches to rationalization in the U.S. liner trades. The Federal Maritime Commission's primary purpose for the analysis was to obtain an estimate of the relative cost benefits that could be derived from a practical rationalization example, first without a decrease in

fleet capacity or port service and then with decreased fleet capacity and port service. FMC's secondary purpose was to obtain and evaluation of the various means of implementation and institutional forms available to achieve rationalization. Rationalization is generally defined as the minimization of the resources required to supply a product or to meet a demand. As applied to the United States liner trades, which are subject to the regulatory authority of the Federal Maritime Commission, we used a special definition of rationalization: to redeploy the liner fleet for reducing fleet size, increasing ship utilization, decreasing operating cost, and reducing fuel consumption, while assuring shippers of adequate capacity and frequency of service to transport the cargoes offered by them.

PB81-142358 PC **A05/MF A01**
Manalytics, Inc., San Francisco, CA.
Rationalization of Liner Service, United States Atlantic and Gulf Ports to Northern Europe. Volume II: Without a Decrease in Fleet Capacity or Port Service.
Final rept.
Sep 79, 87p FMC-RD-81001B
Contract BI-FMC-79-3
See also Volume 1, PB81-142341, and Volume 3, PB81-142366.
Also available in set of 5 reports PC E14, PB81-142333.

Specific methods of rationalization are used by liner ship operators acting together in various trades. Distinctly, they reduce the number of sailings at certain ports, reduce the number of ships in use, optimize ship speed and size, reduce the total capacity serving certain ports, reduce the number of ports of call per voyage, consolidate cargo by feeder vessel services, and consolidate cargo by land transport services. The purpose of the report is to provide one example of the cost benefits of rationalized liner service under the least disruptive circumstances that is, without a decrease in either fleet capacity or port service. The minimum level of rationalization is generated primarily by using the first two methods for rationalization listed above--reduced number of sailings and reduced number of ships. In other examples of rationalization, other methods could be applied and other benefits secured. The data base and analytical method developed in this highly constrained approach to rationalization are suitable for evaluating other rationalization methods under less constrained conditions. The scope of this study was limited to a sub-set of the foreign commerce of the United States, but with a level of generality that could be applied to the analysis of other rationalization approaches.

PB81-142366 PC **A05/MF A01**
Manalytics, Inc., San Francisco, CA.
Rationalization of Liner Service, United States Atlantic and Gulf Ports to Northern Europe. Volume III: With Decreased Fleet Capacity and Port Service.
Final rept.
Jun 80, 90p FMC-RD-81001C
Contract BI-FMC-79-3
See also Volume 2, PB81-142358, and Volume 4, PB81-142374.
Also available in set of 5 reports PC E14, PB81-142333.

For the less constrained approach to rationalization as reported, the same limited geographical scope was used--the United States foreign trade routes between the U.S. Atlantic and Gulf Coasts to Northern Europe,and from the Baltic Sea south to and including the northern coast of Spain. The same cargo traffic data was used for 1978, including U.S. military liner cargo data. And the same characteristics of the liner fleet were used serving those trade routes, as secured from Lloyd's Register; and the same data on the actual liner service provided in 1978, as secured from Lloyd's Voyage Records. In the example of rationalization the liner service between ports was reduced, reflecting less service actually received on many routes. Also, the fleet capacity at midocean was reduced to generate the highest annual percentage utilization of useable ship space. The major conclusions that were drawn from the limited rationalization approach is that the excessively high level of service and capacity offered in 1978 between many port pairs, especially where cargo tonnage is relatively low, must be reduced if the cost efficiencies inherent in rationalization are to be achieved. The cost benefits of rationalization cannot be achieved in the trade routes between U.S. Atlantic and U.S. Gulf Coasts to Europe without reductions in port-to-port service levels and midocean capacities.

PB81-142374 PC **A04/MF A01**
Manalytics, Inc., San Francisco, CA.
Rationalization of Liner Service, United States Atlantic and Gulf Ports to Northern Europe. Volume IV: Means of Implementation and Institutional Forms.
Final rept.
Nov 80, 72p FMC-RD-81001D
Contract BI-FMC-79-3
See also Volume 3, PB81-142366, and Volume 5, PB81-142382.
Also available in set of 5 reports PC E14, PB81-142333.

The elements of a framework that would permit rationalization to take place can be grouped into two categories: (1) A means of implementation through which the participating carriers cooperate in establishing a rationalized shipping service; and (2) An institutional form within which a large part (or all) of the trade is carried only by those carriers who have established a rationalized service, with access to the trade by other carriers (if any) severely limited. The document dicusses in detail the elements of rationalization in terms of both the means of implementation and the institutional forms that satisfy or are compatible with rationalization. The document also describes the features of eleven possible frameworks that could lead to rationalization of liner trades. These rationalization frameworks cover a wide range of possible combinations of institutional form and means of implementation, with the institutional form as the distinguishing characteristic. The institutional forms also cover a wide range of possibilities, from a completely free trade, through trades organized by the carriers and shippers, to various degrees of goverment involvement in controlling liner trade.

PB81-142382 PC **A03/MF A01**
Manalytics, Inc., San Francisco, CA.
Rationalization of Liner Service, United States Atlantic and Gulf Ports to Northern Europe. Volume V: A Glossary of Rationalization Terms.
Final rept.
Nov 80, 42p FMC-RD-81001E
Contract BI-FMC-79-3
See also Volume 4, PB81-142374.
Also available in set of 5 reports PC E14, PB81-142333.

Contents:
- Section 1--Cargo and carrier terms;
- Section 2--Port terms;
- Section 3--Service qualities;
- Section 4--Tariff terms;
- Section 5--Conference terms;
- Section 6--Agreement types;
- Section 7--Institutional forms;
- Section 8--American regulatory terms.

PB81-801953 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Marine Propellers: Design and Fabrication. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.
Dec 80, 137p
Supersedes PB80-801681, and NTIS/PS-78/1177.

The design and manufacture of marine propellers are delineated in these Government-sponsored research reports. Ducted and cycloidal propellers are included in the investigations. Computer aided design and computer aided manufacturing methods are described. (This updated bibliography contains 130 citations, 6 of which are new entries to the previous edition.)

PB81-801961 PC **N01/MF N01**
National Technical Information Service, Springfield, VA.
Marine Propellers: Design and Fabrication. 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 80.
Dec 80, 229p
Supersedes PB80-801699, and NTIS/PS-78/1178.

The design and manufacture of marine propellers are delineated in these reports gathered in a worldwide literature survey. Counterrotating, ducted, and shrouded propellers are among the types reviewed. Computer aided design and computer aided manufacturing methods are described. (This updated bibliography contains 222 citations, 24 of which are new entries to the previous edition.)

13L. Safety Engineering

AD-A094 267/2 PC **A08/MF A01**
California Office of Emergency Services, Sacramento. Fire and Rescue Div.
Heavy Rescue - Student Manual.
Final rept.,
Edward W. Bent. Nov 80, 174p
Contract DCPA01-78-C-0269

Innovation and progress in the development of rescue devices and techniques makes possible significant improvement in the capability for heavy rescue. Effective utilization of the new equipment, tools and techniques requires the mastering of skills in addition to those formerly associated with heavy rescue operations. This manual is intended to provide a continuum in the development of rescue skills for those who have completed basic rescue and vehicular extrication training or have gained practical experience sufficing for such training.

AD-A094 268/0 PC **A05/MF A01**
California Office of Emergency Services, Sacramento. Fire and Rescue Div.
Heavy Rescue - Course Outline.
Final rept.,
Edward W. Bent. Nov 80, 100p
Contract DCPA01-78-C-0269

The course objectives are to provide the student with: (1) Information on basic types of building construction and their collapse characteristics by various causes. (2) Information on various types of methods and equipment used during heavy rescue operations. (3) Methods and procedures for utilizing heavy rescue equipment. (4) Methods of developing improvised rescue equipment utilizing available materials. (5) A simulated exercise utilizing various rescue operations and techniques. (6) Methods and procedures for the maintenance and storage of heavy rescue equipment.

AD-A094 269/8 PC **A06/MF A01**
California Office of Emergency Services, Sacramento. Fire and Rescue Div.
Operator's Manual. Prototype Heavy Rescue/Fire Fighting Vehicle.
Final rept.,
William J. Tonguet. Sep 80, 104p
Contract DCPA01-78-C-0269

Heavy rescue is a commonly recognized weakness in our nation's disaster relief and recovery capability. Recent development of easily portable, lightweight rescue appliances makes feasible the provisions of heavy rescue capability on an immediate response basis. The OES Heavy Rescue/Fire Fighting Unit is a prototype apparatus. It was constructed to provide for practical evaluation and testing of the conceptual feasibility of modular construction and multiple function capability in fire apparatus. Incorporating provisions for heavy rescue, common and specialized fire fighting, and personnel protection for hazardous environments into a single unit of apparatus results in unique design and operating procedures. Careful adherence to the procedures described in this manual will assure reliability and safety in the operation of the vehicle and its functional components. Equipment, tools, and outfittings have been provided to accomplish an infinite variety of rescue and fire fighting missions. Proper care, maintenance, and use are essential to personnel safety and reliable performance. Self-contained power and pneumatic devices must be restricted to use by personnel thoroughly trained in their operation and application.

PATENT-4 219 084 Not available NTIS
National Aeronautics and Space Administration, Cocoa Beach, FL. John F. Kennedy Space Center.
Fire Extinguishing Apparatus Having a Slidable Mass for a Penetrator Nozzle.
Patent,
N. C. Gray, R. M. Senseny, and P. N. Bolton.
Filed 19 Apr 78, patented 26 Aug 80, 4p N81-14137/6, PAT-APPL-897 840
Supersedes PAT-APPL-897 840-78, N78-22328 (16-13, p 1698).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A fire extinguishing apparatus for delivering an extinguishing agent through a barrier surrounding a structure into its interior includes an elongated tubular nozzle body which has a pointed penetrating head carried on one end of the tubular body. A source of extinguishing agent coupled to the opposite end of the tubular body is fed through and passes through passages adjacent the head for delivering the extinguishing agent to the interior of the structure. A slidable mass is carried on the tubular body on a remote end of the tubular body from the penetrating head. By manipulating the slidable mass and bringing such in contact with an abutment the force imparted to the tubular body causes the head to penetrate the structure.

PB81-131617 PC **A04**/MF **A01**
Southwest Research Inst., San Antonio, TX.
Pedestrian Injury Causation Study.
Final rept. 18 Apr 77-17 Jun 80,
George C. Lawrason, T. H. Swiercinsky, and R. H. Mason. Jun 80, 71p SwRI-11-4870, DOT-HS-805 653
Contract DOT-HS-7-01580
Portions of this document are not fully legible.

The objective of the subject study was to increase the knowledge of the vehicle/pedestrian injury severity parameters to such an extent that the data could be the basis for programs aimed at reducing pedestrian injury severity. The Southwest Research Institute designed a pedestrain accident sampling plan that was representative of the total pedestrain accident population in the City of San Antonio; established working arrangements and procedures for notification of pedestrian accidents with the San Antonio Police Department; established procedures to obtain medical data (including x-rays) from medical facilities in the area; and investigated a total of 451 pedestrian accidents in the study area. This report addresses the sampling scheme, notification system, procedures developed, techniques used, and the problem areas associated with the subject contract.

PB81-134819 PC **A03**/MF **A01**
National Transportation Safety Board, Washington, DC. Bureau of Technology.
Special Investigation Report--Tank Car Structural Integrity After Derailment.
16 Oct 80, 42p NTSB-SIR-80-1

Since 1968, the Safety Board has investigated many serious accidents involving release of hazardous materials from tank cars which were either breached or ruptured following derailments. As a result of these investigations, the Safety Board recommended that Federan authorities take remedial action to reduce the likelihood of tank cars releasing their contents in the derailment environment. During its investigation of a railroad derailment near Inwood, Indiana, on November 8, 1979, the Safety Board noted unresolved questions about the dangers posed in handling severely damaged tank cars containing liquefied flammable gases at the accident site. Because of this continuing problem, the Safety Board initiated this special investigation to identify the hazards caused by the actual reduction of the ability of damaged cars to contain their lading; to determine the ability of experts to estimate this reduced capability; and to examine the feasibility of developing practical guidelines to help determine how damaged hazardous materials tank cars should be handled.

PB81-135121 PC **A02**/MF **A01**
Transport and Road Research Lab., Crowthorne (England).
Assessment of Anti-Dazzle Screen on M6,
A. E. Walker, and R. G. Chapman. c1980, 25p TRRL-LR-955
Also pub. as ISSN-0305-1293.

The effects of the presence of an anti-dazzle screen on the central reserve of a 19 km length of the M6 Midlands Link have been assessed in terms of accident occurrence, attitudes of road users, transverse positioning of traffic on the carriageway, and headlamp and lane usage. The report details the results of the accident study, covering reported injury and non-injury accidents. It concludes that the accident rate (per veh km) in the dark on the screened length was 44 per cent lower than would have been expected had there been no screen present. However, this result depends crucially on the reported number of non-injury accidents, and for injury accidents only there is no significant difference between screened and unscreened lengths. Results of the studies of the other aspects which were reported earlier are summarized. It is concluded that the anti-dazzle screen was effective in reducing glare, was acceptable in appearance, had no adverse effect on traffic, and was marginally beneficial in terms of accident reduction. (Copyright (c) Crown Copyright 1980.)

PB81-135410 PC **A04**/MF **A01**
Dynamic Science, Inc., Phoenix, AZ.
Light Truck Aggressivity Study - Test Report 4 - Truck-to-Car Rear-End Impact Test.
Final rept.,
R. Yee, R. Cropper, and S. Davis. Feb 79, 60p 3051-79-3?A, DOT-HS-805 611
Contract DOT-HS-8-01942

The object of this test is to provide truck-to-car collision data. The crash test data from this program will be used to study the aggressivity of light trucks compared to passenger cars, support current vehicle standards, and provide information to upgrade future standards.

PB81-145690 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Evaluation of Electrical Connections for Branch Circuit Wiring.
Final rept.,
William J. Meese, and Robert W. Beausoliel. Nov 80, 71p NBS-BSS-128
Library of Congress catalog card no. 80-600169. Sponsored in part by Department of Housing and Urban Development, Washington, DC. Office of Policy Development and Research, Washington, DC.

Performance criteria and test procedures are presented for the evaluation of electrical connections in branch circuit wiring. Investigations and research undertaken to determine needed characteristics of innovative electrical connections are summarized. Design and installation strategies to lessen the chances of electrical connection failures are discussed. Inherent weaknesses are described for design and installation methods of common types of branch circuit wiring connections or terminations, which appear to make them vulnerable to loosening and overheating. There are technology improvements which demonstrate that innovative electrical connections can be developed which may be less costly when installed, and have less chance of becoming hazardous, than common conventional connections.

PB81-145781 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Calculated Operating Temperatures of Thermally Insulated Electric Cables.
Final rept.,
David D. Evans. Jan 81, 41p NBS-TN-1133
Sponsored in part by Consumer Product Safety Commission, Washington, DC.

Steady-state operating temperatures of current-carrying electric cables buried axially in cylinders of thermal insulation were calculated. Combinations of six types of nonmetallic electric cable, two thermal insulation materials, five thermal insulation thicknesses and a range of currents both greater and less than the typical rated service currents for the cables were studied. These calculations show that thermally insulated electric cables carrying the rated current may exceed the rated operating temperature limit for common cable jacket materials.

13M. Structural Engineering

PB81-130973 PC **E02**/MF **E02**
Building Research Establishment, Princes Risborough (England). Princes Risborough Lab.
Long-Term Performance Tests on Trussed Rafters.
Current papers,
A. P. Mayo. c1980, 16p CP-1/80

Tests have recently been completed at the Princes Risborough Laboratory in which two pairs of trussed rafters, typical of those currently being used in house roofs, were loaded with their full design load for a period of ten years. Subsequent tests to failure on these trussed rafters and on some of the individual joints, which were made with punched metal plate fasteners, indicate that there was no significant loss of strength or stiffness. However throughout the long-term tests the deflections continued to increase although at a reducing rate with the passage of time. Estimates are made of the deflections which would have occurred after fifty years under full design load. (Copyright (c) British Crown Copyright 1980.)

PB81-130981 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
A Study of the Flammability of Bulk Solids and Their Smoke Production in Fires in a Small Compartment.
Current papers,
S. A. Ames, and P. J. Fardell. c1980, 16p CP-3/80

Fire tests have been carried out using a one-third linear scale compartment-corridor facility in which 13 materials have been evaluated with measurements of general burning characteristics and smoke production. The materials (of both natural and synthetic origin) were tested under equal weight conditions and in a form likely to be encountered during the manufacture, storage and general fabrication of materials. The results provide information about the basic burning properties of these materials, but should not be regarded as wholly indicative of their fire behaviour when incorporated finally in buildings. (Copyright (c) British Crown Copyright 1980.)

PB81-130999 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Dry-Lined Masonry Party Walls.
Current papers,
E. C. Sewell, R. S. Alphey, J. E. Savage, and S. J. Flynn. c1980, 41p CP-6/80

The results are described of measurements made as part of a survey of sound insulation between modern dwellings. All types of dry-lined walls (brick, dense blockwork lightweight aggregate blockwork and aerated concrete blockwork), of both solid and cavity construction, for which adequate samples are available are considered. The level of performance incorporated as a deemed-to-satisfy specification in the Building Regulations were attained by just under 40 percent of the solid brick walls tested. The proportion was lower for all the other types of wall considered. Performance with solid and cavity construction is compared for walls of brick and lightweight aggregate blockwork; no evidence is found to suggest that cavity construction leads to generally better performance. None of the types of dry-lined wall considered is found to have superficially better performance than the corresponding type of plastered walls, although the size of the difference varies between extremes of large and highly significant for cavity dense blockwork and of negligible for cavity lightweight aggregate blockwork walls. (Copyright (c) British Crown Copyright 1980).

PB81-131005 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Plastered Solid Blockwork Walls.
Current papers,

E. C. Sewell, R. S. Alphey, J. E. Savage, and S. J. Flynn. c1980, 20p CP-5/80

The results are described of measurements made as part of a survey of sound insulation between modern dwellings. Plastered solid walls of dense aggregate, lightweight aggregate and aerated concrete blockwork are discussed. The level of performance included as a deemed-to-satisfy provision in the Regulations was achieved by 90 per cent of the dense blockwork walls, by about half the lightweight aggregate blockwork walls, and by about a quarter of the aerated concrete blockwork walls. Mean performance was significantly above the level required to meet the minimum deemed-to-satisfy performance level for dense blockwork walls, and significantly below that level for aerated concrete blockwork walls; for lightweight aggregate blockwork walls the sample was too small for the comparison to be decisive. Comparisons of the levels of insulation which 95 per cent of walls of each type of blockwork are expected to surpass with the corresponding level for plastered solid brick walls lead to similar conclusions. For dense blockwork walls, both the mean insulation and the performanc level achieved by 95 per cent of walls are not as good as the corresponding levels for cavity walls of similar blockwork. For the other two types of blockwork, the differences found between the performances of cavity and solid walls are not significant. (Copyright (c) British Crown Copyright 1980.)

PB81-131013 PC **E02**/MF **E02**
Building Research Station, Watford (England).
Field Measurements of the Sound Insulation of Plastered Cavity Masonry Walls.
Current papers,
E. C. Sewell, R. S. Alphey, J. E. Savage, and S. J. Flynn. c1980, 43p CP-4/80

The results are described of measurements made as part of a survey of sound insulation between modern dwellings. Cavity walls built of brickwork, dense aggregate blockwork, lightweight aggregate concrete block work are discussed. For brick and dense aggregate blockwork walls, discussion is restricted to those with flanking structures approximating to one or other of the deemed-to-satisfy specifications in the Building Regulations. For lightweight aggregate blockwork walls, the data are subdivided according to whether the cavity width was 50-70 mm or at least 75 mm, because with the wider range of cavities such walls are generally interpreted as meeting a deemed-to-satisfy specification. A similar subdivision is made for walls of aerated concrete blockwork. The level of performance included as a deemed-to-satisfy provision in the Regulations was achieved by all the dense blockwork walls. Rather less than half the cavity brick walls tested achieved the performance standard; the performance of these walls was apparently lower than that of plastered solid brick walls tested in the survey, although the difference is not large enough to be statistically significant. The performance of recent cavity brick walls appears to be significantly lower than that of similar walls in the period 1948 - 1956. The mean performance of lightweight aggregate and aerated concrete blockwork walls was significantly below the level required to meet the performance standard, irrespective of cavity width, and their performance was significantly lower than that for plastered solid brick walls tested in the survey. Evidence on whether increasing cavity width generally tends to improve performance is inconclusive. (Copyright (c) British Crown Copyright 1980.)

PB81-132698 PC **A07**/MF **A01**
Portland Cement Association, Skokie, IL. Construction Technology Labs.
Coupled Walls in Earthquake-Resistant Buildings, Modeling Techniques and Dynamic Analysis.
Murat Saatcioglu, Arnaldo T. Derecho, and W. Gene Corley. Jun 80, 143p PCA-SER-1628, NSF/RA-800212
Grant NSF-ENV77-15333

This investigation is part of a combined analytical and experimental program to develop design information for earthquake-resistant reinforced concrete structural wall systems. Modeling techniques developed and used for dynamic analysis of coupled wall structures are presented. Particular attention is placed on simulation of inelastic action and detailed aspects of hysteretic moment-rotation relationships. The study includes the following: Selection and design of a 20-story coupled wall structure for dynamic analysis; determination of modeling requirements and development of modeling techniques for computer analysis; modification of the computer program to incorporate improved modeling capabilities; and dynamic analysis to test the analytical model and investigate the effects of selected model features on inelastic response of coupled walls.

PB81-135725 PC **A11**/MF **A01**
Swedish Council for Building Research, Stockholm.
The Finite Element Method for Sheet Metal Structures - Development of a Computer Program,
Anders Eriksson. 1980, 240p ISBN-91-540-3315-2, D31:1980

Reference is made to two problems encountered in sheet metal research where the traditional methods of analysis are inadequate. One method which appears to be capable of analyzing this type of structure is the Finite Element Method. This method which has broadly the same basis as the methods of Ritz and Galerkin for the approximate solution of differential equations may be regarded as a general method for the solution of differential equations in which some functional associated with the equation concerned is minimized. Right from the beginning, however, this method has been developed within structural mechanics. It is usually derived through the formulation of the internal work of a structure on the basis of certain propositions concerning the deformations. Right from the beginning, common applications have been analyses of frame systems and wall panels. In recent years, however, the method has also been applied to oscillation problems, flow problems and heat transport, etc. Many non-linear cases have also been treated in recent years. The object of the work described in this report has been to develop a finite element model for the analysis of structures made up thin plate elements. The aim has been to ascertain whether the finite element method yields a usable model for the analysis of this type of structure, i.e., to find how the different possible instability phenomena are reproduced and what accuracy is attainable in the results. Another point of interest in connection with FE analysis is the demand on computer resources - execution time and storage capacity - which the analysis imposes.

PB81-135733 PC **A09**/MF **A01**
Swedish Council for Building Research, Stockholm.
Stressed Skin Action in Composite Panels Comprising Steel Sheeting and Boards,
Peter Balazs. 1980, 192p ISBN-91-540-3367-5, D40:1980

A panel made up of discrete C-shaped panels can be subjected to a shear force which is substantially in excess of the critical shear buckling load for a single panel, provided that the tension field forces are anchored in the adjacent construction and that the shear buckles in the flanges of the panels can be accepted. Since it is the intention that these panels, in combination with sheets of some different material should form part of floor and wall constructions in light-weight building systems, the interest was concentrated on the investigation of the interaction of the board materials with the sheet metal panels when the composite panel is subjected to an in-plane load. The board material chosen in most cases was plasterboard because of its fire resistance properties. The investigations have mainly concentrated on the boundary condition when the panel is supported on all four sides (test series 1-5), but tests have also been made with panels supported on two sides only (test series 6). In the last series, the stiff edge beams were replaced by a substantially weaker edge stiffener.

PB81-137044 PC **A10**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 1. Guideline for Setting and Adopting Standards for Building Rehabilitation.
Oct 80, 203p HUD-0001803, HUD/PDR-613/1
Contract HUD-H-5033
See also Number 2, PB81-137051.
Also available in set of 8 reports PC E19, PB81-137036.

This initial edition of 'Rehabilitation Guidelines', the first volume in an eight-volume series, presents methods for describing and analyzing a community's existing regulatory system, for assessing the impact of a community's standards, and for amending or modifying the existing regulatory system. It is intended for citizen groups, policymakers in city government, and department heads of code administration and enforcement agencies. An introduction to the regulation of building rehabilitation discusses how the building construction and maintenance regulatory system regulates existing buildings and what current regulations mean for building rehabilitation. It also covers historic preservation and some current regulatory innovations. The existing regulatory system and pertinent characteristics of building rehabilitation in the community are defined, and potential problems such as the violation of existing regulations are identified. Finally, recommendations are established for each of four categories of needed modification: no modification to the current regulatory system is needed, flexible application of the 25-50 percent rule is needed, existing regulatory system needs modification, and a definition of imminent hazards is needed. Diagrams, 11 appendices containing various States building regulations, and a bibliography of 20 citations are appended.

PB81-137051 PC **A02**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 2. Guideline for Approval of Building Rehabilitation.
Oct 80, 22p HUD-0001804, HUD/PDR-613/2
Contract HUD-H-5033
See also Number 1, PB81-137044, and Number 3, PB81-137069.
Also available in set of 8 reports PC E19, PB81-137036.

This second volume in an eight-volume series provides a set of guidelines for municipal approval of building rehabilitation. The guidelines examine the inherent differences between regulating new construction and regulation and presents specific recommendations for dealing with rehabilitation within municipal building departments. The guidelines are designed for building officials, members of the executive and legislative branches of government, and related commissions and organizations involved in developing or implementing building regulations. Five sequential steps of the approval process are examined in detail: (1) the outreach program, which clearly explains a community's approach to rehabilitation; (2) preliminary reviews, which are the first step in the approval process for new building projects; (3) construction permits, including full, partial, and conditional permits; (4) construction inspections, which assure the conformance of the work to the approved plans and to specific code requirements, and (5) maintenance inspections, which reveal whether or not a building is in compliance with the applicable code. Sections relating to rehabilitated buildings and specific recommendations are included, such as initiating a preliminary review step for rehabilitation and incorporating the conclusions of the preliminary review into construction permit processing.

PB81-137069 PC **A02**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 3. Statutory Guideline for Building Rehabilitation.
Oct 80, 16p HUD-0001805, HUD/PDR-613/3
Contract HUD-H-5033
See also Number 2, PB81-137051, and Number 4, PB81-137077.
Also available in set of 8 reports PC E19, PB81-137036.

This third volume in an eight-volume series contains statutory guidelines and enabling legislation that communities can adopt to provide a legal basis for promoting building rehabilitation. The guidelines are part of a series of rehabilitation guidelines designed for voluntary adoption and use by States and communities and intended for use by building officials, members of the executive and

legislative branches of government, and related commissions and organizations involved in developed or implementing building regulations. The guidelines recommend that State and local legislative bodies provide a statement of purpose that includes rehabilitation. Furthermore, they should create a rehabilitation advisory board and emphasize rehabilitation expertise in code rulemaking and appellate bodies. Rulemaking bodies should establish procedures for determining the impact of code revisions and building rehabilitation. In addition, administrative innovation for rehabilitation such as special training programs or field inspection manuals, should be mandated. Special types of code provisions, including alternate materials and equipment or changes in building occupancy or use, may be of value in increasing the discretionary powers of code enforcement bodies. Finally, the appeals section of the code should provide for rehabilitation variances by the appellate body.

PB81-137077 PC **A02**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 4. Guideline for Managing Official Liability Associated with Building Rehabilitation.
Oct 80, 16p HUD-0001806, HUD/PDR-613/4
Contract HUD-H-5033
See also Number 3, PB81-137069, and Number 5, PB81-137085.
Also available in set of 8 reports PC E19, PB81-137036.

The fourth volume in an eight-volume series provides rehabilitation guidelines for use by building officials, members of the executive and legislative branches of government, and related commissions and organizations involved in developing or implementing building regulations. It discusses the key problems posed by the perceived risk of liability, the relationship of these problems to building rehabilitation, and proposed recommendations. For example, undue conservatism in code enforcement is a problem that results from the code official's uncertainty about the liability of State and municipal employees. Statutes developed to fill this vacuum should address government liability (or immunity) for negligent actions. The statutes can be drafted to provide protection for a wide range of public employees, and they would implicitly provide protection for code enforcement functions pertinent to rehabilitation. Other key problem areas encompass specific immunities for code enforcement activities, immunities for elements of code enforcement requiring the exercise of discretion, and reducing the fear of liability by improving agency practices. Footnotes are included.

PB81-137085 PC **A04**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 5. Egress Guideline for Residential Rehabilitation.
Oct 80, 66p HUD-0001807, HUD/PDR-613/5
Contract HUD-H-5033
See also Number 4, PB81-137077, and Number 6, PB81-137093.
Also available in set of 8 reports PC E19, PB81-137036.

This fifth volume of an eight-volume series lists design alternatives for the components of egress that are regulated by current codes, such as number and arrangement of exits, corridors, and stairs; travel distance; dead-end travel; and exit capacity and width. The rehabilitation guidelines are for use by code officials, inspectors, designers, and builders. The volume presents some technical solutions for the code requirements for egress which will establish an approximately equivalent overall level of fire safety although literal code compliance is not achieved. An introductory section describes the applications of the guideline. Basic fire protection and egress principles are reviewed. The various guideline sections are placed in a sequence that parallels the review procedure normally followed by local enforcing officials, beginning with the number of exits and concluding with construction details and specifications. Each of the 11 sections is separated into 3 major parts: a summary of the code requirements and their intent; a discussion of how to identify conditions in a building to determine whether a problem exists; and discussion of selected problems, some representative solutions, and a general narrative relating the two. Footnotes and graphs are included.

PB81-137093 PC **A02**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 6. Electrical Guideline for Residential Rehabilitation.
Oct 80, 25p HUD-0001808, HUD/PDR-613/6
Contract HUD-H-5033
See also Number 5, PB81-137085, and Number 7, PB81-137101.
Also available in set of 8 reports PC E19, PB81-137036.

This sixth volume of an eight-volume series provides rehabilitation guidelines to be used by code officials, inspectors, designers, and builders. The electrical guideline addresses three major subject areas: (1) setting and adopting electrical rehabilitation standards at the State or local level, (2) inspecting standards of the State or local level for inspecting existing electrical installations and (3) problems and solutions for hazardous conditions, inadequate load-carrying capacity, and additions, alternations, and extensions to existing electrical installations. It outlines solutions to common problems associated with electrical rehabilitation, such as eliminating hazardous conditions, grounding, undersized service, number of receptacle outlets, and incompatible materials. The guideline applies to all types of residential occupancies except hotels, rooming houses, dormitories, and housing for the elderly. It is intended to facilitate the maximal reuse of existing electrical installations in circumstances where code requirements for new construction are being applied to a project undergoing rehabilitation. Chapter 10 of the Detroit Electrical Code is appended.

PB81-137101 PC **A03**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 7. Plumbing DWV Guideline for Residential Rehabilitation.
Oct 80, 50p HUD-0001809, HUD/PDR-613/7
Contract HUD-H-5033
See also Number 6, PB81-137093, and Number 8, PB81-137119.
Also available in set of 8 reports PC E19, PB81-137036.

This seventh volume of an eight-volume series provides rehabilitation guidelines for use by code officials, inspectors, designers, and builders who inspect and test existing drain, waste, and vent (DWV) systems. Applicable to all types of residential occupancies, the guide's use should facilitate rehabilitation in circumstances where code requirements for new construction are being applied to a project undergoing rehabilitation. The volume reviews basic drainage and hydraulic concepts including the function of the drainage system, hydraulic principles, flow in drains and stacks, and modes of trap failure. It gives suggestions for carrying out functional performance tests for several modes of failures: self-siphonage, induced siphonage, blowback, and crossflow. The guideline also discusses inspection procedures, documentation, testing, and methods for estimating system capacity, all of which may be required to determine existing conditions. Problems and solutions are presented for correcting existing drainage, waste, and venting (DWV) system structural, hydraulic, and functional defects, and surcharged sewers; relocating fixtures; adding new fixtures to existing DWV systems, extending DWV systems, and installing new DWV systems in existing buildings; and through-the-wall venting. Diagrams are given. Two appendices list performance criteria and examples of acceptable DWV practices for building rehabilitation.

PB81-137119 PC **A08**/MF **A01**
National Inst. of Building Sciences, Washington, DC.
Rehabilitation Guidelines 1980. 8. Guideline on Fire Ratings of Archaic Materials and Assemblies.
Oct 80, 172p HUD-0001810, HUD/PDR-613/8
Contract HUD-H-5033
See also Number 7, PB81-137101.
Also available in set of 8 reports PC E19, PB81-137036.

This report of an eight-volume series, focuses on the fire-related performance of archaic construction, which encompasses those buildings constructed generally before 1950. It contains the fire ratings of building materials and assemblies no longer listed in current building codes or related reference standards. It can be used by architects, engineers, and code officials when evaluating the fire safety of rehabilitation project. Introductory material discusses flame spread, the effects of penetrations, and methods for determining the ratings of assemblies not listed in the guideline. Code requirements for the fire performance of key building elements (e.g., walls, doors, floor/ceiling assemblies, etc.) are appended. They are stated in performance terms--hours of fire resistance. The final evaluation phase of a rehabilitation project is examined, and the experimental and theoretical approaches to design solutions are described that can make possible the continued use of archaic materials and assemblies in the rehabilitated structure. Harmathy's 'Ten Rules of Fire Endurance Ratings' are also included to provide a foundation for extending the appended data to analyze or upgrade current as well as archaic building materials and assemblies. Footnotes, illustrations, and 165 references are supplied.

PB81-140063 PC **A03**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
Thermal Resistance Measurements of a Built-Up Roof System.
Final rept.,
S. J. Treado. Oct 80, 28p NBSIR-80-2100
Sponsored in part by Department of Energy, Washington, DC.

This report describes factors which affect the thermal performance of built-up roof systems, and a technique for making in-place measurements of thermal resistance. This measurement technique utilizes a combination of infrared thermographic imaging, surface heat-flow meters, and surface thermopiles. The thermal resistance of the roof system is computed based on temperature differences across the roof and the measured heat flow through the roof. A field test of the measurement procedure is detailed, along with an examination of the time period required to perform a roof thermal resistance measurement, as related to the thermal time lag for heat flow through the roof due to the effect of the thermal mass of the roof. Roof thermal resistance determinations performed according to this measurement procedure are found to be very accurate, if measurements are performed over a sufficient time interval, the minimum interval being dependent upon the thermal mass of the roof system.

PB81-145203 PC **E02**/MF **E02**
Fire Research Station, Borehamwood (England).
Possible Fire Hazards of Loft Insulating Materials.
Current papers,
H. L. Malhotra, R. J. Sutcliffe, Bobbie Rogowski, and R. Ramaprasad. c1980, 25p CP-2/80

Part I of this paper examines the fire problems associated with lofts and considers the possibility of increasing the incidence of such fires by the addition of insulating materials, particularly those of a combustible nature which are used as loose-fill or are laid in-situ between the joists on the loft floor. The fire behaviour of these materials is examined and attempts are made to define performance criteria which will ensure that the risk of involvement in fire of the roof structure in not significantly increased by the presence of the insulation. Existing methods of evaluating such materials are examined to see if any could provide can adequate measure of these criteria. Part II of the paper proposes two methods of test, designed to assess the flammability and susceptibility to smoldering of loft insulating materials using appropriate ignition sources that have been developed for this purpose; work carried out to assess their suitability is included in appendices. Using the acceptability criteria proposed in Appendix A, a limited series of interlaboratory tests has been carried out; the results suggest that the reproducibility of the test methods is satisfactory. (Copyright (c) British Crown Copyright 1980.)

PB81-145237 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Selected Bibliography on Construction in Soviet Union. Russian-Language Documents Published in the U.S.S.R. Number I.
Jun 79, 17p
See also Number 2, PB81-145245.

This bibliography has been compiled from Soviet documents received by the Office of International Affairs, U.S. Department of Housing and Urban Development (HUD) under the U.S.-U.S.S.R. Agreement for Cooperation in the Field of Housing and Other Construction, for which HUD serves as U.S. Executive Agency. The 83 documents selected for inclusion deal with specific aspects of construction, particularly the areas of utilities and structural components. Each Soviet document was evaluated for its potential benefit to U.S. users. Section I is comprised of those deemed valuable for technical experts and scholars in the construction-related fields. In addition to author(s), title, and facts of publication, an abstract appears for each of these documents. Due to limited funds, most of the publications have not been translated into English.

PB81-145245 PC **A02**/MF **A01**
Department of Housing and Urban Development, Washington, DC. Office of International Affairs.
Selected Bibliography on Construction in the Soviet Union. Russian-Language Documents Published in the U.S.S.R. Number 2.
Sep 79, 19p
See also Number 1, PB81-145237.

This bibliography has been compiled from documents received by the Office of International Affairs, U.S. Department of Housing and Urban Development (HUD) under the U.S.-U.S.S.R. Agreement for Cooperation in the Field of Housing and Other Construction, for which HUD serves as U.S. Executive Agency. The 81 documents selected for inclusion deal with specific aspects of construction, particularly the areas of design and management of construction. Each Soviet document was evaluated for its potential benefit to U.S. users. Section I below is comprised of those deemed valuable for technical experts and scholars in the construction-related fields. In addition to author(s), title, and facts of publication, an abstract appears for each of these documents. Due to limited funds, most of the publications have not been translated into English. (Only those marked by an asterisk have been fully translated.) Other documents, judged to be of marginal value, are listed in Section II of this bibliography. Because of their limited technical interest, abstracts are not published for these items, although English summaries of contents are available upon request.

PB81-152316 PC **A04**/MF **A01**
California Univ., Berkeley. Earthquake Engineering Research Center.
Predictive Dynamic Response of Panel Type Structures under Earthquakes,
J. P. Kollegger, and J. G. Bouwkamp. Oct 80, 70p UCB/EERC-80/31, NSF/RA-800296
Grant NSF-PFR79-08257

The potential coupling of translational and rotational motions of prefabricated panel systems under earthquake ground excitation is studied for several 12-story-high apartment buildings. Placement of apartments along the short end of these buildings and limiting the number of apartments along the long sides resulted in twelve different floor plans. The foundation flexibility was captured mathematically through introduction of a four-story-high 'dummy story'. Resonance and modal analyses were performed indicating considerable coupling of the longitudinal translational and torsional modal components. Under earthquake conditions both uncoupled and coupled translational and rotational motions were identified. The observed behavior was found to depend on both the degree of coupling of translational and rotational modal components of the buildings at the fundamental frequencies, as well as on the earthquake frequency response spectrum. A hypothesis regarding the anticipated behavior under earthquake excitation was developed and successfully tested against the analytical predicted structural response.

PB81-801995 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Effects: Buildings and Bridges. 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 80.
Jan 81, 369p
Supersedes PB80-801988, and NTIS/PS-78/1209.

Dynamic structural response of buildings and bridges to wind pressure and gust loads are investigated in these reports gathered from a worldwide literature survey. (This updated bibliography contains 362 citations, 49 of which are new entries to the previous edition.)

PB81-802019 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Wind Effects: Buildings and Bridges. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.
Jan 81, 128p
Supersedes PB80-801962, and NTIS/PS-78/1207.

Dynamic structural responses of buildings and bridges to wind pressure and gust loads are investigated in these Government-sponsored research reports. Residential buildings, skyscrapers, and bridge structures exposed to winds are studied. (This updated bibliography contains 221 citations, 21 of which are new entries to the previous edition.)

14.

METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A094 038/7 PC **A03**/MF **A01**
Army Test and Evaluation Command, Aberdeen Proving Ground, MD.
Testing of Sensor Materiel.
Final rept. on test operations procedure.
30 Nov 80, 41p Rept no. TOP-6-3-527

This Test Operations Procedure provides basic procedures for conducting tests of vehicle and personnel intrusion detectors (sensors) and related materiel in any environment. It applies to testing of all types of tactical unattended ground sensors which work on the principles of detection of an outside stimulus, logic processing of that stimulus, and transmission of a coded signal to a readout device. Included are sensors which operate on magnetic, seismic, acoustic, electromagnetic and audio detection principles. This document describes methods for determining operational effectiveness of sensors to include false alarm rate (susceptibility to undesired sources), detection range and a probability of detection, probability of correct classification and mission length data. Survivability of air-delivered or artillery-delivered sensors is also considered. Evaluations of readout devices are limited to probability of reception, transmission, and display of sensor messages. Common procedures such as preoperational inspection, physical characteristics, human factors, and camouflage and concealment are referenced as appropriate. (Author)

AD-A094 194/8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Materials Science and Engineering.
Microdielectrometry: A New Method for In Situ Cure Monitoring.
Technical rept. no. 2, Sep 79-Dec 80,
Norman F. Sheppard, Steven L. Garverick, David R. Day, and Stephen D. Senturia. 19 Dec 80, 21p
Contract N00014-78-C-0591, Grant NSF-DMR78-24185
Sponsored in part by Grant NSF-ENG-77-17129.

Integrated circuit technology has been used to develop a miniature dielectric cure monitor probe that combines small size with built in amplification to achieve good sensitivity down to 1 Hz, making the probe more sensitive to physical property changes than conventional dielectrometers operating at 1000 Hz. This paper describes the design and operation of the microdielectrometer chip, and the model used to determine the complex dielectric constant of the material under study. Two typical applications are illustrated by experiments. First, results of a postcure study of a Versamide 140, Epon 828 mixture are presented and compared to the results of a similar study using a conventional parallel plate capacitor. In a second experiment, several probes were placed in a 100 ml mold and used to monitor the cure of a sample of the same resin system. The data show the nonuniformity of cure within the sample, and can be explained on the basis of gelation and the temperature dependence of the dielectric properties as determined in the post-cure experiment. (Author)

AD-A094 213/6 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Effects of Window Configuration on Model Pressure Distribution in Wind Tunnels with Perforated Walls.
Final rept. Oct 78-Sep 79,
F. L. Heltsley. Jan 81, 59p Rept no. AEDC-TR-80-1
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Larger optical windows for access to the model flow field in the Arnold Engineering Development Center (AEDC) transonic wind tunnels will be required for optimum utilization of the laser velocimeter (LV). A combined analytical and experimental investigation was performed to assess the effects of such windows upon the performance of the perforated walls. The experimental results from the Aerodynamic Wind Tunnel (1T) indicate that although the wall interference characteristics of some window configurations approach the standard porous wall, none of the configurations tested exhibited adequate wave cancellation for all Mach numbers from M at infinity = 1.0 through 1.4. A variable porosity wall arrangement is described which appears to be capable of providing acceptable optical access without adversely affecting the tunnel flow field. (Author)

AD-A094 254/0 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Sting Interference Effects on a 7 Deg Cone as Determined by Measurements of Dynamic Stability Derivatives and Base Pressure for Mach Numbers 0.2 through 1.3.
Final rept.,
F. B. Cyran. Dec 79, 42p Rept no. AEDC-TSR-79-P75
Prepared in cooperation with ARO, Inc., Tullahoma, TN. See also Rept. nos. AEDC-TR-77-66, AD-A042 747 and AEDC-TR-79-89, AD-A091 115.

The effects of sting support interference were investigated on the measurements of pitch damping, yaw damping, pitching moment slope, pitching moment and base pressure. The model was a 15 percent spherically blunt 7 deg cone. The forced oscillation technique was used to obtained data at Mach numbers 0.2 to 1.3 and Reynolds numbers, based on model based diameter, of 0.2 million to 3.6 million. The amplitude of oscillation was + or - 1 deg, and the reduced frequency parameters ranged from 0.006 to 0.049. The test was conducted at two oscillation frequencies, nominally 3.1 and 5.6 Hz. Pitch damping data were obtained at angles of attack of 0 to 28 deg, and yaw damping data were obtained at angles of attack of 0 to 20

deg. The effective sting length was varied from 1 to 3.4 model diameters. The interference effects of two types of model wake splitter plates were also investigated. The data obtained from this test at the transonic test conditions agreed with the results extrapolated from previous tests at AEDC at supersonic-hypersonic test conditions. (Author)

AD-A094 270/6 PC **A03**/MF **A01**
Army Natick Research and Development Labs., MA.
Development of an Apparatus for Biaxial and Shear Stress-Strain Testing of Fabrics and Films.
Final rept. Oct 75-Sep 79,
Constantin J. Monego, and Malcolm N. Pilsworth, Jr. Oct 80, 48p Rept no. NATICK/TR-80/028

This report describes the design, construction and evaluation of an apparatus for the measurement of the behavior of fabrics under biaxial tensile and shear forces. The instrument was evaluated by the testing of fabrics ranging in weight from 34 g/m to 486 g/m, corresponding to material applications ranging from lightweight parachute fabrics to heavyweight ballistic fabrics. The testwork demonstrates that the instrument, within the limitations of the testing techniques developed to date, can be used to provide the information necessary for the design of structural fabrics, the drafting of improved procurement specifications for fabrics and qualification of new fabrics for military applications. Technical problems and limitations of the instrument and of the testing techniques which require further study are discussed. (Author)

AD-A094 300/1 PC **A05**/MF **A01**
Hughes Aircraft Co., Fullerton, CA. Ground Systems Group.
Manufacturing Methods and Technology for Digital Fault Isolation of Printed Circuit Boards. Appendix.
Final rept.
15 Nov 80, 100p Rept no. HAC-FR-80-12-975-APP
Contract DAAK40-78-C-0290
Appendix to AD-A093 797.

This report describes the manufacturing technology and test system that will enable detection, identification, and location of digital faults in the advanced missile electronic system that will be used in the 1980's. Emphasis is placed on the fault diagnosis of large printed circuit boards containing complex hybrid digital microelectronic circuits. The Hughes-enhanced, state-of-the-art, DTS-70 automatic test system installed at Redstone Arsenal as a result of this contract provides the capability to isolate digital faults in such circuit boards to the component level with a test comprehensiveness of 90% or better.

AD-A094 468/6 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
A Novel Device for the Accurate Dispensing of Small Volumes of Liquid Samples
Interim technical rept.,
J. G. Shabushnig, and Gary M. Hieftje. 26 Jan 81, 26p Rept nos. TR-32, 40
Contract N00014-76-C-0838

A sample dispenser with electronic control of delivered volume has been designed and evaluated. With the new device, liquid samples are dispensed in the form of uniform droplets less than 4 nL in volume; total volumes as small as 40 nL can be delivered with 1.5% precision. Important features of the microdroplet formation process have been studied and the effect of sample solution concentration and viscosity have been examined. The new dispenser is expected to find application in several areas, including electrothermal atomization atomic absorption spectrometry, automated titrimetry, and high-precision, low-volume solution sampling. (Author)

AD-A950 125/5 PC **A05**/MF **A01**
David Taylor Model Basin, Washington, DC.
Design of Electromagnetic Damping Apparatus.
Nov 30, 76p Rept no. DTMB-269

No abstract available.

AD-A950 126/3 PC **A03**/MF **A01**
David Taylor Model Basin, Washington, DC.
An Improved Portable Strain Gage.
Jan 31, 50p Rept no. DTMB-272

No abstract available.

AD-A950 135/4 PC **A02**/MF **A01**
David Taylor Model Basin, Washington, DC.
Experimental Determination of the Suitability of Crystal Accelerometers for Shock Measurements.
W. F. Curtis, and H. L. Rich. May 44, 8p Rept no. DTMB-R-246

No abstract available.

AD-A950 142/0 PC **A03**/MF **A01**
David Taylor Model Basin, Washington, DC.
Instructions for Setting Up and Operating Electrically Recording Extensometers Fitted with Bellevue Gages Serial Numbers 1 to 5 Inclusive, Model 1930.
Jan 31, 35p Rept no. DTMB-278

No abstract available.

BNL-28583 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Spectrometer Control Subsystem with High Level Functionality for Use at the National Synchrotron Light Source.
J. L. Alberi, and F. W. Stubblefield. Nov 80, 9p CONF-801103-14
Contract AC02-76CH00016
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

We have developed a subsystem capable of controlling stepping motors in a wide variety of vuv and x-ray spectrometers to be used at the National Sychrotron Light Source. The subsystem is capable of controlling up to 15 motors with encoder readback and ramped acceleration/deceleration. Both absolute and incremental encoders may be used in any mixture. Function commands to the subsystem are communicated via ASCII characters over an asynchronous serial link in a well-defined protocol in decipherable English. Thus the unit can be controlled via write statements in a high-level language. Details of hardware implementation will be presented. (ERA citation 06:004089)

ENICO-1059 PC **A03**/MF **A01**
Exxon Nuclear Idaho Co., Inc., Idaho Falls.
Remote Maintenance Testing, 1 July 1979-30 June 1980.
R. D. Fletcher. Oct 80, 43p
Contract AC07-79ID01675

The results of remote handling and remote maintenance testing at the Remote Maintenance Test Facility (RMTF) from July 1, 1979, through June 30, 1980, are presented. Specific test arrangements and test results from the RMTF of such items as a sample bottle evacuation system, in-cell TV camera support, krypton encapsulation, remote pipe cutting and welding, and dissolver closure drive shaft coupling in support of several projects and general plant maintenance are discussed. (ERA citation 06:004001)

PAT-APPL-6-163 001 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Conjugate-Phase, Remote-Clock Synchronizer.
Patent Application,
William M. Waters. Filed 16 Jul 80, 13p AD-D007 995/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a method for synchronizing a master clock and a remote slave clock which nominally has the same pulse frequency but may be out of time-phase. The method consists of transmitting a master pulse to the slave, measuring the time delay, between the received pulse and the nearest succeeding (in time) slave pulse, delaying the latter slave pulse to provide a conjugate slave pulse, transmitting the conjugate pulse to the master station and measuring the time difference between time of reception of the conjugate pulse and time of generation of the original master pulse. The time is equal to twice the error between the master and slave pulses. The process can also be done at the slave station if the slave pulse is transmitted to the master and a conjugate-phase master pulse is retransmitted to the slave where the measurement is accomplished. The phase of the slave pulse can then be adjusted to synchronize it with the master pulse.

PAT-APPL-6-186 109 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Phase Sensor for R.F. Transmission Lines.
Patent Application,
Charles M. DeSantis. Filed 11 Sep 80, 6p AD-D008 009/3
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A phase sensing device is described which is useful for indicating the resonance condition of a complex load impedance (such as an antenna), with a high degree of accuracy over the frequency range from .3 to 100 MHz. The device uses readily available transmission line and solid state components to provide a + or - indication of the phase condition of the load; a zero crossing indicates resonance. Such a signal is useful for controlling an automatic tuning mechanism that could be used in a tunable antenna. The extremely broadband operation and no physical connection to the main RF line are salient features of the device. The components are a transmission line coupler with a short pick-up wire mounted adjacent to the center conductor, two diodes with like electrodes (cathodes) connected to opposite ends of the pick up wire, a carbon resistor between the other electrodes of the diodes, and a zero center meter across the resistor.

PAT-APPL-6-191 044 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Method of Implementing Uniform Background Charge Subtraction in a Radiation Sensing Array.
Patent Application,
W. F. Kosonocky. Filed 25 Sep 80, 21p AD-D008 050/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Uniform background charge subtraction in a radiation sensing array is realized by removing the background charge from the array detectors several times during each array integration time. Radiation sensing arrays of the type to which the method of the invention can be applied include a radiation sensor with a charge storage reservoir to which there is coupled a CCd output register having a channel with multiple charge storage sites. Signal background and bias charge is accumulated in the charge storage reservoir and transferred to a CCD storage site by a transfer gate. Charge in the CCD storage site can be shifted to another storage site in the CCD channel or it can be dispersed to drain by means of a drain barrier gate.

PAT-APPL-6-195 444 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
System and Method for Measurement of Dynamic Angular or Linear Displacement.
Patent Application,
Aleck Loker, and Richard Archibald. Filed 7 Oct 80, 16p AD-D008 025/9
Availability: This Government-owned invention available for U.S. licensing and possibly, for foreign licensing. Copy of application available NTIS

This invention relates to a system and method for measuring linear displacements, especially wear in the coupling of two rotating shafts. A magnetic pickup is located near each shaft and a magnetic pole located at a fixed position on each shaft induces a magnetic pulse in its associated pickup when the pole passes under the pickup. The pulses are fed to an AND and produce an output pulse when they overlap. As wear progresses, the magnetic pulses overlap either more or less, depending on the direction of rotation of the shafts and, correspondingly, the AND-gate output pulse

duration increases or decreases. The change in AND-gate pulse duration is a measure of coupling wear and can be recorded or displayed in engineering measurement units. (Author)

PAT-APPL-6-202 032 PC **A02**/MF **A01**
Department of Agriculture, Washington, DC.
Method and Apparatus for Automatic Egg Mass Counting.
Patent Application,
Daniel T. Jennings, Charles K. Carniglia, and David B. Young. Filed 29 Oct 80, 24p PB81-147506
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The invention is in the area of determining the presence of biological masses on foliage. In particular, the invention is directed to a method and apparatus for automatic counting of insect egg masses on foliage samples.

PAT-APPL-6-203 938 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Angular Accelerometer.
Patent Application,
Howard T. Savage. Filed 4 Nov 80, 9p AD-D008 002/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to an angular accelerometer that has a high coupling factor, temperature stability and can function at low frequencies. The accelerometer is provided with a cylinder of Terfenol (Tb.27Dy.73F2) positioned in a conducting nonferromagnetic hollow cylinder having a ferromagnetic base and a ferromagnetic lid. The cylinder of Terfenol is compressed between the ferromagnetic lid and base with the compression adjusted for maximum magnetomechanical coupling and strength. Permanent magnets are also positioned in the hollow cylinder to provide magnetic bias to the Terfenol cylinder. When the accelerometer undergoes an angular acceleration about its cylindrical axis a voltage will appear between the center and the ends of the Terfenol cylinder. By measuring the voltage, the angular (rotational) acceleration of the accelerometer about its cylindrical axis may be determined.

PAT-APPL-6-207 487 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Phase Linear Interferometer System and Method.
Patent Application,
William Manning Sherrill, Douglas Neal Travers, and Paul Edward Martin. Filed 17 Nov 80, 9p AD-D008 011/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A radio interferometer system and method for obtaining more accurate readings from a radio source by processing the received signal as a plane wave and establishing coincidence locations and conditions, and discarding readings which are noncoincidence within a selected tolerance. (Author)

PATENT-4 231 103 Not available NTIS
Department of the Navy, Washington, DC.
Fast Fourier Transform Spectral Analysis System Employing Adaptive Window.
Patent,
John E. Timm. Filed 12 Feb 79, patented 28 Oct 80, 10p AD-D008 035/8, PAT-APPL-6-011 339
Supersedes PAT-APPL-6-011 339, AD-D005 973.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A spectral analysis system includes a Fast Fourier Transform (FFT) processor which receives a time domain signal and provides a specified number of initial signal strength estimates, each of the initial estimates being equal to one of the frequency domain coefficients of the Fast Fourier Transform of the time domain signal which is generated when the time domain signal is sampled at a number of intervals equal to the number of initial estimates, over a time period of specified duration. The system further includes an adjustable window element receiving a selected number of the initial estimates for sensing or detecting the presence of a leakage component in a given one of the initial estimates, and for providing an adjusted signal strength estimate, the adjusted signal strength estimate comprising the difference between the given initial estimate and the leakage component. A spectral recorder receiving a number of adjusted estimates is provided to record the spectral lines, or frequency components, of the time domain signal, and the relative strengths thereof. (Author)

PATENT-4 234 258 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Stark Cell Optoacoustic Detection of Constituent Gases in Sample.
Patent,
J. S. Margolis, and M. S. Shumate. Filed 31 Aug 78, patented 18 Nov 80, 7p N81-14015/4, PAT-APPL-938 297
Supersedes PAT-APPL-938 297-78, N79-10169 (17-01, p 0023). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

An optoacoustic detector for gas analysis is implemented with Stark effect cell modulation for switching a beam in and out of coincidence with a spectral line of a constituent gas in order to eliminate the heating effect of laser energy in the cell as a source of background noise. By using a multiline laser, and linearly sweeping the DC bias voltage while exciting the cell with a multiline laser, it is possible to obtain a spectrum from which to determine the combinations of excited constituents and determine their concentrations in parts per million.

PB81-133621 PC **A05**/MF **A01**
Johns Hopkins Univ., Laurel, MD. Applied Physics Lab.
Space Systems: An Auroral Imaging Spectrophotometer (Vacuum Ultraviolet and Visible),
F. W. Schenkel. Aug 80, 77p JHU/APL-CP-079

An imaging system is described that will provide spectrophotometric data of the earth's aurora from a satellite-based platform. The instrument has two camera heads, one operating in the vacuum ultraviolet (12.0 to 200.0 nm) spectrum, the other operating in the visible/near ultraviolet (300.0 to 750.0 nm) spectrum. The camera heads are equipped with a variety of spectral bandfilters that are selectable from a filter wheel to define the auroral spectral band of interest. Each camera has a collapsible sunshade that is deployed after spacecraft launch. An illumination sensor is included to provide solar damage protection. Separate processing electronics exist for each camera head, but they are switchable between heads to provide selective redundancy. Each camera head uses the most recent developments in microchannel plate image intensifiers in conjunction with solid-state two-dimensional matrix sensors.

PB81-135279 Not available NTIS
National Bureau of Standards, Washington, DC.
National and International Standards for NDT: to Achieve Improved Repeatability and Measures Related to Performance,
Harold Berger. 1979, 12p
Pub. in Proceedings of the World Conference on Non-Destructive Testing (9th) Held at Melbourne, Australia on Nov 18-23, 1979, 6-3, 12p 1979.

Nondestructive testing (NDT) standards provide a practical procedure to bring some measure of reproducibility to NDT measurements. Nevertheless, better standards are needed both to improve reproducibility and to provide quantitative data for performance-related analyses.

PB81-135295 Not available NTIS
National Bureau of Standards, Washington, DC.
A Comparison of NDT Standards in the US and USSR,
V. A. Koukhar, A. A. Maksimov, and H. Berger. 1979, 9p
Pub. in Proceedings of the World Conference on Non-Destructive Testing (9th) Held at Melbourne, Australia on Nov 18-23, 1979, 6-3, 9p 1979.

An initial comparison and analysis is given for several radiographic and ultrasonic standards of the US (ASTM) and the USSR (GOST). This study is part of a joint US/USSR project on automated information systems in standardization. Differences between standards are pointed out.

PB81-136822 Not available NTIS
National Bureau of Standards, Washington, DC.
Absolute Gravity as a Reconnaissance Tool for Vertical Height Changes and for Studying Density Changes,
J. E. Faller, R. Rinker, and M. Zumberge. 1980, 13p
Sponsored in part by Air Force Geophysics Lab., Hanscom AFB, MA., and Geological Survey, Washington, DC.
Pub. in Proceedings of International Symposium on Problems Related to the Redefinition of North American Vertical Geodetic Networks (2nd), Ottawa, Canada, May 26-30, 1980, p919-931 1980.

A major effort is under way to develop a highly portable absolute gravimeter having an accuracy of 3 microgal or better. Significant progress toward this end has been made. The instrument uses the method of free fall and consists basically of four parts: a drag free dropping chamber, a long period isolation device, a stabilized laser, and the necessary timing electronics. The size and weight of these units is such that the apparatus can be easily handled and assembled by a single person. The expected measurement time required at any given site is about one hour. As the instrument's gravity measurements are based on secondary length and time standards, it is inherently drift free. The authors believe field use of it will significantly advance the study of tectonic processes, including vertical height changes.

PB81-139545
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
The Spanish Naval Observatory,
W. V. Burt. 30 Jun 80, 2p
Included in European Scientific Notes, v34 n6 p281-282, 30 Jun 80.

No abstract available.

PB81-140186 Not available NTIS
National Bureau of Standards, Washington, DC.
The Use of Deuterium Lamps as Radiometric Standards between 115 nm and 350 nm,
J. Z. Klose, J. M. Bridges, and W. R. Ott. 1980, 3p
Pub. in Proceedings of the International Conference on Vacuum Ultraviolet Radiation Physics (6th), University of Virginia, Charlottesville, VA., June 2-6, 1980, Paper III-52 in VUV Lasers, Synchrotron Radiation, Atmospheric and Space, Instrumentation, and Applications III, p1-3 1980.

The spectrum of a deuterium lamp has been investigated at wavelengths shorter than 165 nm for use as a radiometric standard. Applications are discussed.

PB81-142788 Not available NTIS
National Bureau of Standards, Washington, DC.
Basic Limits in Real-Time Industrial Radiographic Systems,
Masao Kuriyama, William J. Boettinger, and Harold E. Burdette. 1980, 15p
Pub. in Proceedings of the Symposium on Real-Time Radiologic Imaging, Philadelphia, PA., Sep 1980, Paper in American Society Testing Materials Special Technical Publication STP716, p113-127 1980.

The paper discusses (1) collimation of primary radiation, including apparent size of sources, (2) monochromatic radiography to obtain true signals, (3) resolution improvement by a magnification of x-ray images before the radiation reaches the detecting (or viewing) system and briefly (4) intensification of signals when crystal collimation is used.

PB81-143570 Not available NTIS
National Bureau of Standards, Washington, DC.
Needed: A Fracture Mechanics Vocabulary,
Charles G. Interrante. 1979, 3p

Pub. in Am. Soc. Test. Mater. Stand. News 7, n4 p22-24 1979.

Terminology for fracture testing is developed within Committee E-24 through the cooperative efforts of the entire membership of the Main Committee.

PB81-144206 Not available NTIS
National Bureau of Standards, Washington, DC.
Preparation of Calibration Standards for Coating Thickness Instruments,
Fielding Ogburn. 1978, 9p
Pub. in Proceedings of American Electroplaters Society Symposium on Thickness Testing of Surface Finishing (1st), New York, NY., February 28-March 1, 1978, p1-9.

Coating thickness gages can be calibrated with specimens having adherent coatings of known thickness, with foils, or with synthetic standards. To prepare calibration standards with adherent coatings, the coatings must be plated with uniform thickness distribution. This requires a cell geometry providing a uniform primary current distribution and careful control of solution agitation, current efficiency, and polarization.

PB81-144339 Not available NTIS
National Bureau of Standards, Washington, DC.
Measurement of Synchrotron Radiation from the NBS SURF II Using a Silicon Radiometer,
A. R. Schaefer. 1979, 6p
Pub. in Proceedings of Annual International Tech. Symposium of the SPIE (23rd), San Diego, CA., August 27-30, 1979, Paper in Measurements of Optical Radiations 197, p84-89 1979.

A project is described in which the synchrotron radiation output from the NBS storage ring known as SURF II, will be measured using a well characterized silicon based radiometer. The radiometer consists of a silicon photodiode coupled with two interference filters to restrict the spectral response to a finite and convenient spectral region for the measurement. Considerations required for the characterization of the radiometer are discussed. The absolute radiant flux from the storage ring is also calculable from various machine parameters. A measurement of the number of circulating electrons will be derived from electron counting techniques at low levels. This will yield an important intercomparison between two entirely different determinations of the synchrotron radiant flux.

PB81-145484 Not available NTIS
National Bureau of Standards, Washington, DC.
Neutron Diffraction and Small-Angle Scattering as Nondestructive Probes of the Microstructure of Materials,
C. J. Glinka, H. J. Prask, and C. S. Choi. 1980, 22p
Pub. in Proceedings of the Conference on Mechanics of Nondestructive Testing (1980), p143-164 1980.

This article gives a brief introduction to small-angle and wide-angle neutron scattering methods as they pertain to the nondestructive evaluation of materials properties.

PB81-145518 Not available NTIS
National Bureau of Standards, Washington, DC.
On the Possibility of an Absolute Radiometric Standard Based on the Quantum Efficiency of a Silicon Photodiode,
Jon Geist. 1979, 9p
Pub. in Proceedings of the Annual International Tech. Symposium of the SPIE (23rd), San Diego, CA., August 27-30, 1979, Paper in Measurements of Optical Radiations 197, p75-83 1979.

The physical mechanisms governing the behavior of silicon photovoltaic p-n junctions are reviewed from the point of view of using the internal quantum efficiency of such devices as absolute radiometric standards.

PB81-145757 PC **A02**/MF **A01**
National Bureau of Standards, Washington, DC. National Engineering Lab.
A Basis for Traceable NDE Measurements,
D. G. Eitzen, H. Berger, and G. Birnbaum. Dec 80, 18p NBSIR-80-2109

The National Bureau of Standards is beginning to provide a mechanism for traceability for a number of NDE measurement procedures, an activity that is expected to have a significant, positive impact on the reproducibility and accuracy of NDE measurements. Much of the NDE standards activity has been in ultrasonics and acoustic emission, these efforts leading to calibration services for ultrasonic reference blocks and ultrasonic and acoustic emission transducers. Additional NDE standards are also available or are being developed in radiography, eddy currents, magnetic particles, liquid penetrants and visual testing.

PB81-149395 Not available NTIS
National Bureau of Standards, Washington, DC.
The Analysis of Complex Aromatic Hydrocarbon Mixtures Using Solid Silver Nitrate Columns,
Stanley P. Wasik, and Robert L. Brown. Dec 76, 3p
Pub. in Analytical Chemistry 48, n14 p2218-2220 Dec 76.

A highly efficient chromatographic column consisting of glass beads coated with solid silver nitrate and modified by water vapor in the carrier gas can be used at room temperature to analyze in a reasonable time mixtures containing aromatic hydrocarbons having boiling points up to 180C. The construction of this column is described and its properties discussed. Its efficiency is compared with conventional gas-liquid chromatographic columns.

PB81-149437 Not available NTIS
National Bureau of Standards, Washington, DC.
Cavity Radiometer Reflectance,
E. F. Zalewski, J. Geist, and R. C. Willson. 1979, 7p
Pub. in Proceedings of Annual International Tech. Symposium of the SPIE (23rd), San Diego, CA., August 27-30, 1979, Paper in Measurements of Optical Radiations 197, p152-158 1979.

The evolution of absorbing surfaces for electrically calibrated radiometers, and techniques for measuring their absorptance (reflectance) are described. A new reflectometer for cavity reflectance measurements, which is based on a ring-shaped silicon photodiode, is described. The results of reflectance measurements on a series of cavities which represent the evolution of cavity technology are presented, and the significance of the results for future research are discussed.

PB81-149445 Not available NTIS
National Bureau of Standards, Washington, DC.
Preliminary Results of the Interlaboratory Comparison of Detector Spectral Response Transfer Capabilities,
Edward F. Zalewski. 1979, 3p
Pub. in Proceedings of Electro-Optics/Laser 79 Conference and Exposition, Anaheim, CA., October 23-25, 1979, p414-419 1979.

As part of the NBS detector spectral response calibration program, participating laboratories were asked to report the results of several diagnostic and response transfer simulation experiments. The diagnostic tests probed for wavelength inaccuracies and stray light problems. In the response transfer simulation experiments the participants measured, on the basis of the absolute spectral responsivity supplied with the detector, alternative spectral response functions generated by absorbing glass filters placed in front of the detector. The results of these measurements are an assessment of the state of the art of detector spectral response calibrations among the laboratories participating in this program. This paper describes the results of the diagnostic and intercomparison measurements in the visible spectral region.

PB81-149841 Not available NTIS
National Bureau of Standards, Washington, DC.
A Rapid Cycle Method for Gross Leak Testing with the Helium Leak Detector,
S. Ruthberg. 1980, 7p
Pub. in Proceedings of the 1980 Electronic Components Conference (30th), San Francisco, CA., April 28-30, 1980, p128-134 1980.

A new noncontaminating dry gas, quantitative test method has been developed that permits gross leak measurements on hermatic packages.

PB81-149874 Not available NTIS
National Bureau of Standards, Washington, DC.
Assessment of the Accuracy of Spectrophotometric Measurements and Methodologies.
Final rept.,
R. W. Burke, and R. Mavrodineanu. 1980, 21p
Pub. in American Society of Testing Materials Special Technical Publication 708, p45-65 1980.

Modern day spectrophotometers are used to perform both relative and absolute transmittance or absorbance measurements. In order to discuss these two distinct functions, this paper is divided essentially into two parts. The first part discusses the instrumental parameters that must be verified in order to assure that the measurement is accurate and outlines the several types of National Bureau of Standards (NBS) Standard Reference Materials (SRM) that are currently available, or in process, for performing these verifications. The second part of the paper focuses on analytical method accuracy and describes a number of spectrophotometric procedures that have been widely used at NBS with the belief that they produce accurate results. In instances where sufficient data exist, the accuracy of these procedures is reexamined by comparison of the spectrophotometric values with those obtained by the accepted definitive isotope dilution mass spectrometric method. The paper concludes with some projections on the possible future use of ultraviolet-visible absorption spectrophotometry as a practical, multielement technique.

PB81-150104 PC **A03**/MF **A01**
Bureau of Mines, Pittsburgh, PA. Pittsburgh Research Center.
Correlation of the Fibrous Aerosol Monitor with the Optical Membrane Filter Count Technique.
Rept. of investigations/1980,
Steven J. Page. 1980, 27p BUMINES-RI-8467

The Bureau of Mines used fiber-laden air to test two identical fibrous aerosol monitors (FAM) in order to establish the FAM-optical count correlation. The FAM is a unique instrument developed by GCA Corp. (GCA) to measure realtime fibrous aerosol concentrations. It will also respond to particulates that have sufficient shape irregularities to possess fiber characteristics such as the 3:1 length:diameter (L:D) aspect ratio.

PB81-856767 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Lysimeters. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 110p NERACUSGNT1984
Sponsored by National Technical Information Service, Springfield, VA.

The citations cover research studies of lysimeters applied to the measurement of various forms of groundwater leaching. (Contains 84 citations, fully indexed and including a table of contents.)

14E. Reprography

AD-A094 255/7 PC **A02**/MF **A01**
California Inst. of Tech., Pasadena.
Construction and Calibration of an Holographic Camera Designed for Micro Bubbles Observation in Cavitation Research.
Technical rept.,
Joseph Katz. Oct 79, 21p Rept no. ENG-183-4
Contract N00014-75-C-0378

Applying holography as a technique of measuring the size distribution of micro bubbles and particles in liquids brings up the possibility of direct observation of micro objects, and thus knowing their exact shape and size. The present technical note deals with the design of a holocamera, and its calibration. In the present system, a ruby laser is used for producing the coherent, linearly polarized light source (0.6943 micrometer wavelength) for the hologram recording, and a CW He-Ne laser (0.6328 micrometer - wavelength) is used as a light source for the reconstruction process. More detailed description of the instrumentation will be given later.

PAT-APPL-6-168 854 PC A02/MF A01
Department of the Navy, Washington, DC.
Remote Lens Focusing System for an Aerial Camera.
Patent Application,
Michael Mocenter, and Harry Koper. Filed 23 Jul 80, 14p AD-D008 023/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A system for remotely controlled focusing of a reconnaissance camera installed on an aircraft. The camera can be focused to any of a plurality of preselected focused position, each position having a unique corresponding binary coded decimal designator generated from a position correlated switch. When a change in focus is selected by depression of a push button switch, the resulting binary coded decimal designator for the desired focus position is added to the binary coded decimal designator from the optical switch. Differences between the two designators will cause a scanner to rotate and scan all optical switches, while simultaneously a gear mechanism adjusts the camera lens focus position to the position corresponding to that for the switch scan at that increment of time. When the scanner locates the activated switch whose binary coded decimal designator is the same as the designator of the selected pushbutton, scanning and focusing adjustments are halted. (Author)

PB81-134843 PC A06/MF A01
South Dakota State Univ., Brookings. Water Resources Inst.
Detection of Saline Seeps.
Completion rept.,
John L. Wiersma, Maurice L. Horton, Paul Brown, Lynn Brun, and Ron Beyer. Jun 80, 109p W81-00975, OWRT-B-043-SDAK(1)
Contract DI-14-34-0001-6117
Prepared in cooperation with North Dakota Water Resources Research Inst., Fargo and Montana State Univ., Bozeman. Water Resources Research Center.

The purpose of this study was to develop and test remote sensing techniques for detection of potential sites for seep development, for detection of seeps in an early stage of development and for monitoring the rate of growth of active seeps. Due to the regional nature of the problem, test sites were selected in Montana, North Dakota, and South Dakota. Aerial photography and thermal data were supported by ground truth on each site.

PB81-856254 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Printing Machinery. January, 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 94p NERACEI NT2250
Sponsored by National Technical Information Service, Springfield, VA.

Worldwide information covers applications of printing machinery such as flexography, gravure, letterpress, lithography, offset, photolithography, silk screen, and color printing. Ink jet high speed and videographic printing machinery are also discussed. (Contains 98 citations, fully indexed and including a table of contents.)

PB81-857690 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Cameras and Their Applications. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 194p NERACSPNNT2795
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the design, development, operation and performance of various types of cameras used in a wide variety of commercial, engineering, and scientific applications. (Contains 238 citations, fully indexed and including a table of contents.)

15. MILITARY SCIENCES

15A. Antisubmarine Warfare

AD-A094 570/9 PC A06/MF A01
Naval Postgraduate School, Monterey, CA.
An ASW Campaign Model.
Master's thesis,
Mark Douglas Frost. Sep 80, 122p

To enhance insight into a war at sea, a large-scale, aggregated, and highly flexible model of the ASW campaign is offered. The model was designed, first and foremost, to examine the change in the marginal effectiveness of friendly ASW forces due to changes of force level, force mix, and force employment strategies. The model is keyed to the interaction of the threat submarine force with friendly ASW forces and merchant or military shipping. Specific features of the model provide for threat deployment options, allocation of friendly forces, attrition to threat and friendly forces, aggregation of friendly ASW force performance, sensitivity to force levels, deployment of submarines within 'wolfpacks' and coordinated barrier stations, and parametric treatment of other warfare area effectiveness. The campaign model has been programmed in the APL/360 language for use on an IBM 360-67 computer. (Author)

15B. Chemical, Biological, and Radiological Warfare

AD-A094 239/1 PC A02/MF A01
Army Armament Research and Development Command, Aberdeen Proving Ground, MD. Chemical Systems Lab.
Increasing Retention of the VGH, ABC-M8 Chemical Agent Detector Paper Indicator Pigments.
Technical rept. Apr 77-Jul 80,
Peter F. Annunziato. Oct 80, 19p ARCSL-TR-80072, AD-E410 352

To combat the rising costs of the indicator pigments used in the ABC VGH-M8 chemical agent detector paper (M8 paper), a manufacturing methods and technology (MMT) project was initiated. Results obtained during the MMT project show that the use of a retention aid during M8 paper production will increase indicator pigment retention by approximately 11.5 percent. This will amount to substantial cost savings for future buys of M8 paper. An additional benefit of minimizing dye losses is the reducing of the quantity of mutagenic/carcinogenic material introduced in production waste filtration systems.

15C. Defense

AD-A094 496/7 PC A02/MF A01
Army War Coll. Strategic Studies Inst., Carlisle Barracks, PA.
The Year 2000 and the US Army.
Futures group rept.,
Joseph L. Sites, John F. Scott, and Charles W. Taylor. 17 Oct 80, 24p

This paper lists and discusses the conditions existing in the year 2000 which will have the greatest impact on the US Army. The paper is based on work done by the Futures Group and information received from outside agencies. This represents the first attempt to specifically identify and list those future conditions which will have the greatest impact on the Army and it is intended that this paper will be reviewed and refined periodically. (Author)

AD-A094 517/0 PC A08/MF A01
Institute for Defense Analyses, Arlington, VA. Program Analysis Div.
Development of Civil Defense Damage Assessment Programs.
Final rept.,
Leo A. Schmidt. Nov 80, 162p IDA-P-1526, IDA/HQ-80-22838, AD-E500 236
Contract DCPA01-77-C-0215

This study documents efforts leading towards the development of a national damage assessment system to analyze damage resulting from a nuclear attack. It describes conversion of a number of programs from the IDA computer to that currently used at the FEMA Olney Computer Center. It documents computer programs developed for road network data base management and for nationwide fallout dose calculations. A narrative description of study activities and conclusions concerning requirements for damage assessment systems are presented.

AD-A094 557/6 PC A04/MF A01
Naval Postgraduate School, Monterey, CA.
Probabilistic Model and Analysis of Conventional Preinstalled Mine Field Defense.
Master's thesis,
Young Un Lee. Sep 80, 61p

Simple models for a defense consisting of a preinstalled mine field possibly defended by an anti-tank weapon are derived and analyzed. This paper user a special Poisson process to model the one or two positions of mines in the mine field. The duel between the anti-tank weapon and offensive tanks crossing the field is modeled with a continuous time Markov chain. Some algebraic solutions and numerical results are obtained for specific scenarios.

PB81-856379 PC N01/MF N01
New England Research Application Center, Storrs, CT.
Civil Defense. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 131p NERACEDBNT2451
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover survivability in nuclear environment, demographics and casualty prediction analysis, community shelters for protection from radioactive fallout, crisis relocation management concepts, civil defense studies, shelter construction and radiation protection, civil defense contingency planning, and maintaing nutritional adequacy during a prolonged food crisis. (Contains 122 citations, fully indexed and including a table of contents.)

15E. Logistics

AD-A094 046/0 PC A04/MF A01
Naval Weapons Support Center, Crane, IN.
Fleet Reliability Assessment Program. Volume 1. General Program Report.
Final rept.,
William E. Wallace, Jr. Sep 79, 63p
See also Volume 2A, AD-A093 921.

The FLEET RELIABILITY ASSESSMENT PROGRAM (FRAP) was created as a result of a top priority Chief of Naval Materiel (CNM) requirement for a fast, reliable, and accurate system of problem identification on new electronic equipment installations aboard ships. FRAP typically monitors a selected sample of an equipment population over a period of six months. The failure data collected from maintenance actions performed during this period is analyzed and reports are generated

which identify the problems and recommend corrective actions. The basic goals of the program are to improve operational reliability and to reduce life cycle costs. An important objective of the program is the quick identification of problems so that corrective actions can be taken early in the equipment life cycle. There are several distinct advantages to this approach: Reliability, Contractor Liability, Cost Avoidance, Allowance Parts List, Data Collection, Information Distribution, and Corrective Actions.

AD-A094 048/6 PC **A03**/MF **A01**
Army Library, Washington, DC.
Mobilization: Preparedness, Manpower, Industrial. A Selective Bibliography, 1918-1979.
Jul 80, 43p

This bibliography on Mobilization cites historic materials and goes up to 1980. It includes books, periodicals and law items. (Author)

AD-A094 051/0 PC **A09**/MF **A01**
Army Logistics Center, Fort Lee, VA.
The United States Army Logistics Center Historical Summary (RCS-HIS-6 (R2)), 1 October 1978 to 30 September 1979.
18 Sep 80, 197p

This volume is the fourth of the US Army Logistics Center's Annual Historical Summaries. Topics include: Mission and Organization; Training the Force; Material Developments--Weapons and Equipment; Doctrine; Automated Systems; Force Structure and Test; and Operations Analysis Support.

AD-A094 250/8 PC **A04**/MF **A01**
Naval Sea Systems Command, Washington, DC.
Reliability (R) and Maintainability (M) Design Checklist.
Oct 77, 53p Rept no. NAVSEA-S0300-AC-MMA-010-r/m

This document has been developed by the Naval Ship Engineering Center of the Naval Sea Systems Command to aid in the assurance of adequate levels of Reliability (R) and Maintainability (M) of Naval shipboard equipment. It consists of two separate but complementary checklists for reviewing and evaluating a contractor's R program and M program with emphasis on the detailed R&M design efforts. In addition to the detailed R&M design efforts (Sections 2 through 11 and 22 through 28) these checklists also cover the areas of: R&M Management (Sections 1 and 21); and R&M Demonstration Test Planning (Sections 12 and 28). During a program applicable sections of these checklists should be completed and updated as the program progresses. These checklists can be provided to the contractor to be used as guides for establishing and implementing his R&M programs, or can be contractually required to be completed by the contractor and submitted as a data item to the Navy prior to formal design reviews. They can be used by the Navy for randomly auditing the contractor's R&M program, design effort and demonstration test planning effort; as guides for evaluating R&M during design reviews; or used for follow-up of corrective action in areas found to be deficient. Although these checklists were developed for electronic equipment acquisition, the majority of the questions contained therein are equally applicable to electrical, mechanical and electromechanical systems and equipment.

AD-A094 386/0 PC **A08**/MF **A01**
Uniroyal, Inc., Naugatuck, CT. Consumer Products Div.
Production of Insulated Footwear Using Liquid Injection Molding Equipment. 2. Instruction Manual.
Final rept. 15 Sep 77-15 Jul 79,
James H. Flood. Sep 80, 172p NATICK-TR-80/020, NATICK/CEMEL-217
Contract DAAK60-77-C-0071
See also AD-A091 881.

A manufacturing line has been designed, fabricated and installed to produce finished lightweight insulated footwear from liquid injection molded expanded polyurethane. The minimum production rate is sixty pair of boots per week, utilizing the equipment one shift per day, five days per week. These boots will meet established design criteria and required physical properties. The equipment is capable of producing boots in a size range of 4 through 14 and widths from XN to XW. This Instruction Manual describes the production equipment and its functions, production methods, and process conditions required to fabricate the lightweight insulated boot. Detailed prints and photographs are included for the major equipment pieces.

AD-A094 437/1 PC **A06**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Deployment of United Nations Peace Keeping Forces: The Nature of Transportation and Review of Current Methodologies.
Master's thesis,
Anthony S. I. Ukpo. 6 Jun 80, 125p AD-E750 059

The United Nations, in its thirty-five years of existence, has launched about fourteen peace-keeping and observer operations all over the world. The most important aspect of establishing a peacekeeping force is the ability to transport the force from its location to the area of operation as quickly as possible. To date, the United Nations has continued to depend on ad hoc arrangements to deploy all its peace-keeping forces. This study analyses the various methodologies currently in use by the UN to determine their suitability for present and future employment. To highlight the various problems, three case studies--United Nations Emergency Force (UNEF), 1956; United Nations Operations in the Congo (ONUC), 1960; and United Nations Interim Force in Lebanon (UNIFIL), 1978--were selected for analysis. Some of the major points that came out of this study include: -- heavy dependence on the United States for air- and sealift of the UN force, -- waste of vital time due to questions of neutrality and incompatibility of resources, -- nonchalant attitude by countries capable of providing necessary transportation, and -- an increasing attempt by developing nations to be entirely self-supporting in transportation of their troops, sometimes to the possible detriment of the entire UN force. This study concludes that the current ad hoc arrangements for deployment of UN forces leave too much room for failure. Therefore, there is a need to examine alternative methods of providing neutral transportation assets for the UN to deploy peace-keeping forces. (author)

AD-A094 538/6 PC **A07**/MF **A01**
Arinc Research Corp., Annapolis, MD.
Depot Acquisition Management and Engineering Support for Close-In Weapon System (CIWS) Phalanx Mk 15 and FCS Mk 92/Gun Mount Mk 75 Overhaul Programs.
Final rept. 18 Apr-17 Dec 80,
J. Fedor, and J. Pittenger. Dec 80, 136p Rept no. 1678-01-1-2350
Contract N00174-80-C-0241

The tasks described in the contract included: (1) Update CIWS DLMF (Depot-Level Maintenance Facility) Management Guide. Review the current Preliminary Program Management Plan for the CIWS DLMF for adequacy and provide engineering and other technical support needed to rewrite the plan. (2) Assist in the formulation of a CIWS Failure Data Analysis Center by developing a preliminary Failure Data Analysis Center (FDAC) Management Plan encompassing the Center's responsibilities, operation and management. (3) Provide engineering support to develop a Technical Repair Standard specimen that is tailored to satisfy the requirements of organic repair/testing of CIWS CCAs (Circuit Card Assemblies) and modules. (4) Provide continuing engineering, management, and logistic support as required to assist NOSIH, in the development, implementation, and operation of DLMF acquisition management program for the CIWS, for FCS Mk 92, and Gun Mount Mk 75.

AD-A094 616/0 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Analysis of the 1977 AD/AR TARSLL.
Master's thesis,
James Wiley Hargrove, Jr. Sep 80, 97p

The industrial mission of Destroyer Tenders (AD) and Repair Ships (AR) is to provide intermediate level maintenance and repair for supported ships. The Tender and Repair Ship Load List for these ships (AD/AR TARSLL) designates the range (number) and depth (quantity) of repair parts to be carried to support this industrial mission. This thesis details the logical reasoning and mathematical theory used to develop the 1977 AD/AR TARSLL, including an analysis of the data development, the mathematical inventory model and procedures used, and various assumptions and constraints applied during the process. Actual demand history for the six AD/AR's in the Atlantic fleet for a two year period from 1977 to 1979 was used to evaluate the effectiveness of the load list. The effects of certain assumptions in the model on the load list were analyzed. The proposed changes for the 1980 TARSLL were incorporated in the 1977 TARSLL and evaluated. Also, alternative models and methods of load list development were proposed and evaluated. (Author)

PB81-143505 CP **T02**
American Management Association, New York.
NATO Supply Code for Manufacturers Excluding U.S. and Canada, Code Sequence (H4-3).
Data file,
Jack Seelenbinder, and Mario Arroyo. Feb 81,
mag tape DSA-FC-H4-3-SEC-D, DSA/DF-81/007
Supersedes Rept. no. DSA/DF-80/004, PB80-131691.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density and parity. Call NTIS Computer Products if you have questions.

This magnetic tape contains Organizational Entities (O.E.s) that maintain design control and/or is a source of supply for items procedure and cataloged by agencies of the Federal Government, the North Atlantic Treaty Organization (NATO) member nations and other participating friendly governments, such as Australia. These coded Organizational Entities are in O.E. Code sequence and record such information as the name of the coded O.E., its geographical location, former name and/or location, if applicable, assigned O.E. code, status of coded O.E.; active, obsolete, canceled with or without a replacement. In some instances, the replacement O.E. will be located in the United States, its possessions, or Canada. In this instance, refer to the Federal Supply Code for Manufacturers, United States and Canada (H 4-1/H 4-2) for the applicalbe replacement O.E. Code data.

PB81-143513 CP **T02**
American Management Association, New York.
NATO Supply Code for Manufacturers Excluding U.S. and Canada, Name Sequence.
Data file,
Jack Seelenbinder, and Mario Arroyo. Feb 81,
mag tape DSA-FC-H4-3-SEC-B, DSA/DF-81/006
Supersedes Rept. no. DSA/DF-80/003, PB80-131725.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions.

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PB81-144115 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Federal Personnel and Compensation Div.
Military Exchange Systems: How They Can Provide More Benefits for Military Personnel.
Report to the Congress.

18 Jul 80, 41p FPCD-80-50

The report discusses the organizational structure of military exchange systems and the Department of Defense requirement for exchanges to generate profits as a source of funds for other morale, welfare, and recreation activities. The report contains recommendations to the Secretary of Defense which could improve benefits to military personnel by consolidating exchange functions and reducing costs to taxpayers by alternative funding of those activities.

PB81-911000 Standing Order
American Management Association, New York.
Federal Supply Code for Manufacturers, U.S. and Canada, Code Sequence.
Data file,
Jack Seelenbinder, and Mario Arroyo. Feb 81, mag tape
Supersedes PB80-911000.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Available on Standing Order, Deposit Account required. North American Continent price $175.00/issue, individual issue $210.00; all others write for quote. Updated 6 times a year.

This magnetic tape contains Organizational Entities (O.E.s) that are manufacturers or maintain design control of items of supply procured and cataloged by agencies of the Federal Government. These coded Organizational Entities are in O.E. Code sequence and record such information as the name of the coded O.E., its geographical location, former name and/or location, if applicable, assigned O.E. Code, status of coded O.E.; i.e., active, obsolete, canceled with or without a replacement. In some instances, the replacement O.E. will be located in a North Atlantic Treaty Organization (NATO) member nation, or other participating friendly foreign country, such as Australia. In this instance, refer to the NATO Supply Code for Manufacturers, excluding United States and Canada (H 4-3) for the applicable replacement O.E. Code data.

15F. Nuclear Warfare

AD-A094 429/8 PC **A06**/MF **A01**
BDM Corp., Albuquerque, NM.
Theater Nuclear Force Survivability and Security Instrumentation. Engineering Development Phase.
Final rept. 1 Dec 78-1 Nov 79,
T. J. Andrews, R. S. Fitzgerald, N. P. Hochhausler, C. G. Hoover, and M. A. Ondrik. 15 May 80, 110p BDM/TAC-79-611-TR, DNA-5158F
Contract DNA001-78-C-0194

This report presents the status of the engineering development phase of the TNF-S2 Instrumentation Development effort. Evaluation of TNS-S2 technologies, hardware, and concepts required field testing in both controlled test environments and simulated tactical environments. Free-play, force-on-force testing, and real-time casualty assessment provide the two-sided, free-flowing operational scenarios necessary to determine successfully the resolution of the majority of the TNF-S2 issues. (author)

15G. Operations, Strategy, and Tactics

AD-A094 211/0 PC **A09**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
Wartime Interoperability Problems Posed by Differences in South Korean and United States Army Tactics.
Master's thesis,
James M. Simpson. 6 Jun 80, 192p AD-E750 046

This study attempts to determine if there are serious problems which could result in time of war from differences in tactics used by Republic of Korea and United States ground forces. Although the Republic of Korea has adopted a form of American tactics, such factors as terrain, weaponry and the North Korean threat have dictated modifications in doctrine by the South Korean Army. The specific tactical forms analyzed in this study include the offense and defense, airborne, airmobile and amphibious operations, and several types of unconventional warfare operations. Investigations reveals that there are many similarities between U.S. and R.O.K. doctrine, but that there are also several major differences, some of which are significant enough to cause needless casualties. A worst-case combat scenario is presented to demonstrate the possible effects of tactical differences. The study concludes that the differences in R.O.K. and U.S. tactics are significant and warrant corrective action prior to combined combat operations. Differences in map symbology, equipment and force organization which could hamper combined operations are also highlighted. The study recommends that U.S. forces in Korea be trained in Korean tactics, and that this concept be expanded to include U.S. forces elsewhere which have contingency missions for the area. The study further recommends that a U.S. Army field manual which explains the differences in tactics be published for reference. Finally, since analysis reveals that problems are minimized at lower echelons, it is recommended that cross-attachment of Korean and American units be accomplished at the lowest level possible. (author)

AD-A094 335/7 PC **A02**/MF **A01**
Center for Planning and Research, Inc., Palo Alto, CA.
Soviet Strategic and Tactical Strategy. Volume I. Viability of the ABM Treaty in the 1980's--A Note on the Issue.
Topical Rept. 1 Feb-30 Nov 78,
William T. Lee. 30 Nov 78, 24p DNA-4869T-1
Contract DNA001-78-C-0161

This research effort pertains to topical reports addressing subjects of interest to Theater Nuclear Warfare and Strategic Nuclear Warfare and their relationship to national policy. (Author)

AD-A094 448/8 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Projecting the Future for Situation Assessment and Planning: A Cognitive Analysis.
Interim rept.,
Barbara Hayes-Roth. Nov 80, 48p Rept no. RAND/R-1600-AF
Contract F49620-77-C-0023

Situation assessment and planning rely heavily on the decisionmaker's ability to project future conditions in the environment and the impact of tentative planned actions on those conditions. This note presents a cognitive analysis of the future projection process. It identifies three projection strategies-retrieval from experience, formal analysis, and mental simulation--and characterizes their strengths and weaknesses. It also discusses the impact of three general cognitive factors--operation at different levels of abstraction, motivational factors, and attribution problems--on the future projection process. Based on this analysis, the note proposes a cognitive technology for developing and training effective future projection processes. (Author)

AD-A094 449/6 PC **A02**/MF **A01**
RAND Corp., Santa Monica, CA.
Soviet Strategic Conduct and the Prospects for Stability.
Interim rept.,
Benjamin S. Lambeth. Dec 80, 25p Rept no. RAND/R-2579-AF
Contract F49620-77-C-0023

Throughout the past decade, the Soviets have refused to entertain SALT proposals that would require the Soviet Union to become an active partner in increasing its own vulnerabilities. They have also revealed a penchant for immoderate levels of arms acquisition, which raises disturbing questions about their willingness to settle for a strategic posture 'essentially equivalent' to that of the United States. These features of Soviet strategic style constitute major obstacles in the path of achieving a cooperative solution to the security dilemma traditionally espoused by Western theories of mutual assured destruction. If the United States is to endure as a respectable player in the strategic arms competition, it will have to begin imposing measures conducive to stability through a strategy that appeals primarily to Soviet sensitivities, rather than to the doubtful prospect of eventual Soviet convergence with preferred concepts of the West. (author)

AD-A094 487/6 PC **A16**/MF **A01**
Defense Intelligence Agency, Washington, DC.
Defense Attache Saigon: RNAVF Quarterly Assessment. 2nd Quarter FY74.
Rept. for 1 Oct-1 Dec 73,
John E. Murray, and Walter A. Williams. 1 Feb 74, 368p
Sanitized version of AD-C016 035L.

Contents: Threat Assessment; Friendly Situation; RVNAF Intelligence Capability; RVNAF Force Structure; Vietnamese Army; Vietnamese Air Force; Vietnamese Navy; Vietnamese Marine Corps; Territorial forces; RVNAF Communications Electronic Capability; Republic of Vietnam Armed Forces Training; RVNAF Programs, Plans and Morale; JGS Command and Control; Distinguished Visitors; DATT Assessment.

AD-A094 488/4 MF **A01**
Defense intelligence Agency, Washington, DC.
Defense Attache Saigon: RVNAF Quarterly Assessment, 3rd Quarter FY74.
Rept. for 1 Jan-31 Mar 74,
John E. Murray, and Walter A. Williams. 1 May 74, 440p
Santizied version of AD-C016 036L.
Availability: Microfiche copies only.

Contents: Threat Assessment; Friendly Situation; RVNAF Intelligence Capability; RVNAF Force Structure; Vietnamese Army; Vietnamese Air Force; Vietnamese Navy; Vietnamese Marine Corps; Territorial Forces; RVNAF Communications-Electronics Capability; Republic of Vietnam Armed Force Training; RVNAF Plans and Programs and Morale; JGS Command and Control; Distinguished Visitors; DATT Assessment.

AD-A094 489/2 PC **A14**/MF **A01**
Defense Intelligence Agency, Washington, DC.
Defense Attache Saigon: RVNAF Quarterly Assessment, 4th Quarter FY74.
Rept. for 1 Apr-30 Jun 74,
John E. Murray, and Maximilian Lamont. 1 Aug 74, 325p
Sanitized version of AD-C016 037L.

Contents: Threat Assessment; Friendly Situation; RVNAF Intelligence Capability; RVNAF Force Structure; Vietnamese Army; Vietnamese Air Force; Vietnamese Navy; Vietnamese Marine Corps; Territorial Forces; RVNAF Communications-Electronics Capability; Republic of Vietnam Armed Force Training; RVNAF Plans and Programs and Morale; JGS Command and Control; Distinguished Visitors; DATT Assessment.

AD-A094 490/0 PC **A12**/MF **A01**
Defense Intelligence Agency, Washington, DC.
Defense Attache Saigon: RVNAF Quarterly Assessment, 1st Quarter FY75.
Rept. for 1 Jul-30 Sep 74,
H. D. Smith, and Maximilian Lamont. 1 Nov 74, 275p
Santized version of AD-C016 038L.

Partial Contents: Threat Assessment; Friendly Situation; RVNAF Intelligence; RVNAF Force Structure; Vietnamese Army; Vietnamese Air Force; Vietnamese Navy; Vietnamese Marine Corps; Territorial Forces; RVNAF Communications/Electronics Capability; RV Armed Forces Training; RVNAF Plans, Programs and Morale; and Joint General Staff Command and Control.

AD-A094 491/8 PC **A11**/MF **A01**
Defense Intelligence Agency, Washington, DC.
Defense Attache Saigon: RVNAF Quarterly Assessment, 2nd Quarter FY75.
Rept. for 1 Oct-31 Dec 74,
H. D. Smith, Maximilian Lamont, and W. E. Legro. 1 Feb 75, 247p

Sanitized version of AD-C016 039L.

Contents: Threat Assessment; Friendly Situation; RVNAF Intelligence Capability; RVNAF Force Structure; Vietnamese Army (ARVN); Vietnamese Air Force (VNAF); Vietnamese Navy (VNN); Vietnamese Marine Corps (VNMC); Territorial Forces; RVNAF Communications-Electronics Capability; Republic of Vietnam Armed Force Training; RVNAF Plans and Programs and Morale; JGS Command and Control; Distinguished Visitors; DATT Assessment.

AD-A094 492/6 PC **A12**/MF **A01**
Defense Intelligence Agency, Washington, DC.
Defense Attache Saigon: RVNAF Final Assessment, 1 January thru 25 April FY 75,
H. D. Smith, and Maximilian Lamont. 15 Jun 75, 275p
Sanitized version of AD-C016 040L.

Contents: Threat Assessment; Friendly Situation; RVNAF Intelligence Capabilities; RVNAF Force Structure; Vietnamese Army (ARVN); Vietnamese Air Force (VNAF); Vietnamese Navy (VNN); Vietnamese Marine Corps (VNMC); Territorial Forces (TF); RVNAF Communications-Electronics Capability; Republic of Vietnam Armed Forces Training; RVNAF Programs, Plans and Morale; JGS Command and Control; DAO Distinguished Visitors; Evacuation of Military Regions 1 and 2; Evacuation of Saigon--Introduction, Observations of the Defense Attache, Observations of the Service Attaches, Special Planning Group Activities, Control, Coordination, Communications and Execution fo Sealift and Airlift Operations, Personnel Processing, Movement of Sensitive Vietnamese Nationals, Operation Talon Vise/Frequent Wind.

AD-A094 536/0 PC **A04**/MF **A01**
Command and Control Technical Center, Washington, DC.
The CCTC Quick-Reacting General War Gaming System (QUICK) Program Maintenance Manual. Volume II. Weapon/Target Identification Subsystem. Change 2.
30 Jun 79, 72p Rept no. CCTC-CSM-MM-9-77-N2-chg-2
Change 2 to report dated Nov 78, AD-A050 081. See also Change 1, AD-A063 385.

No abstract available.

16. MISSILE TECHNOLOGY

16A. Missile Launching and Ground Support

AD-A094 299/5 PC **A99**/MF **A01**
Army Engineer Div., Huntsville, AL.
Shock Test Program. Shock Isolation Design Manual for SAFEGUARD TSE Systems and Equipment.
Final rept.,
Gordon C. Chan, Robert Yang, Herbert Saffell, and Charles C. Huang. 1 Aug 73, 617p Rept no. HNDSP-73-98-ED-R

The report contains 4 parts. Part I, Design and Theoretical Considerations, Part II, User's Instructions for Computer Program, Part III Program Listings for both ISIP (Integrated Shock Isolation Program) and ISIP2, and Part IV, examples. ISIP is formulated on the basis of considering the shock isolation platform and the equipment on it as a rigid body six-degree of freedom system having large response amplitudes. ISIP2 includes a treatment of shock isolation systems having relatively flexible platforms. Both ISIP and ISIP2 accept acceleration-time history excitation. For the shock isolation systems the excitation of which is given in terms of a shock spectrum, a synthesized acceleration time function must be obtained as the first step toward problem solution. Waveform Synthesis is performed by WAVSYN which is a subprogram of ISIP and ISIP2. The design parameters and their interrelationships which affect the performance of a shock isolation system are discussed, and several design configurations and various elastic and dissipative elements in shock isolation systems are investigated. Analytical treatments of the problem, which forms the basis of computational procedures, are included. The report is organized for the convenience of practicing engineers who have had previous exposures to rigid body mechanics, structural dynamics and the Fortran language. (Author)

16B. Missile Trajectories

AD-A094 302/7 PC **A03**/MF **A01**
Federal Electric Corp., Vandenberg AFB, CA. Systems Performance Analysis Dept.
Trajectory Reconstruction and Analysis Methodology. Integration of the Trajectory and Transition Matrices for Powered Flight.
Final rept.,
Gene T. Thompson. May 80, 41p AS300-T-80-16, WSMC-TR-80-2
Contract F04703-77-C-0111

TRAM or the Trajectory Reconstruction and Analysis method is prototype software under development of the Western Space and Missile Center that will render improvements in the range's capability for Best Estimate of Trajectory Prediction. This report compares the modified Euler and Runge-Kutta methods of integrating the missile's powered flight trajectory and demonstrates that the Runge-Kutta is best. The report also compares the Runge-Kutta and the Adams-Moulton integrators in the TRAM transition matrix computation and again determines that the Runge-Kutta produces less error. Spline polynomials were also investigated as an interpolation technique in order to reduce integration time. (Author)

16C. Missile Warheads and Fuses

AD-A094 212/8 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Boundary-Layer Transition on Large-Scale CMT Graphite Nosetips at Reentry Conditions.
Final rept. 26 Jan-10 Aug 78,
R. M. Raper. Jan 81, 44p Rept no. AEDC-TR-79-45
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

A series of tests designed to investigate the boundary-layer transition characteristics of preablated CMT graphite nosetips was conducted in a hypervelocity track facility. The location of the zone at which transition from laminar to turbulent flow occurred was measured on a number of nosetips having radii of 0.40, 0.80, and 1.125 in. The nosetips were tested at nominally 16 kfps over a free-stream pressure range of 0.13 to 0.40 atm. Transition front locations were inferred from nosetip surface temperature distributions obtained using a photographic pyrometry technique, and fronts were observed to range from the proximity of the stagnation point to the sonic point. It was observed that the mean transition location moved forward on the nosetip as test pressure increased. The circumferential variations about the mean transition location over a given nosetip decreased as the mean location moved nearer to the stagnation point. (Author)

16D. Missiles

PATENT-4 234 142 Not available NTIS
Department of the Navy, Washington, DC.
High Angle-of-Attack Missile Control System for Aerodynamically Controlled Missiles.
Patent,
David J. Yost, Arthur Arrow, and Robert L. Konigsberg. Filed 8 Jun 78, patented 18 Nov 80, 14p AD-D008 037/4, PAT-APPL-913 981
Supersedes PAT-APPL-913 981-78.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A missile control system can avoid instability at high angles of attack by cross-coupling roll and steering sensor signals between the steering and roll channels. The control law for the system is derived by use of the Model-in-the-Performance Index Technique which makes the system respond at high angles as it does at low angles with desired response times, bandwidths, and stability.

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A094 027/0 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
The Cylindrical Transducer at the Underwater Sound Laboratory.
Technical document,
H. E. Nash. 6 Oct 80, 26p Rept no. NUSC-TD-6335
Presented at the Meeting of the Acoustical Society of America (93rd), University Park, PA, 6-10 Jun 77.

Two major projects in the field of scanning sonar were initiated at the Harvard Underwater Sound Laboratory and completed at the New London Underwater Sound Laboratory, following transfer in July 1945. The first of these developments involved the exploitation of the scanning sonar principle in a vertical scanning system for target depth determination. This was designed as part of a complete search/attack system known as the Type B Integrated Sonar. The second major development was an electronically rotated scanning system intended for use by submarines. This system, known as the XQKA, employed a rotation rate of 300 Hz and thus permitted the use of short pulses -- a desirable attribute for a submarine sonar. This presentation describes these two projects, and then discusses some of the work of the Underwater Sound Laboratory that led to the cylindrical and spherical arrays now employed on Navy ships and submarines.

AD-A094 049/4 PC **A03**/MF **A01**
Naval Sea Systems Command, Washington, DC.
Management Plan for Ocean Environmental Acoustics Programs in Support of Mobile Sonar Technology Development,
Carey D. Smith, and Jerry L. Bardin. 11 Jun 75, 46p Rept no. NAVSEA-06H1/036-EVA/MOST-1

The role of the U. S. Navy as a credible world sea power is placing increasing demands on sonar sys-

tems development for ASW. The management of the Navy's Ocean Environmental Acoustic Program (EVA) is of great concern because of the critical nature of this support service to systems development. At present, sonar developers and operators do not have sufficient EVA data and models available for optimum systems design and use. The deficiency is primarily due to a technological gap between EVA program outputs and the system developers requirements. The most effective and efficient management and implementation of the EVA program is therefore required. A detailed plan for a program management structure in NAVSEA (Sonar Technology Division) is presented; it calls for the establishment of a technical group assigned the responsibility for developing and maintaining a working relationship between environmental acousticians and systems developers.

AD-A094 061/9 PC **A03**/MF **A01**
Texas Univ. at Austin. Applied Research Labs.
A High Resolution, Low Frequency Parametric System for Oceanographic Research.
Technical rept.,
Lewis A. Thompson, Larry R. Cox, Harlan G. Frey, and T. G. Muir. 10 Apr 80, 34p Rept no. ARL-TR-80-23
Contract N00014-75-C-0161

The development and application of a parametric acoustic array system is described. Key features include a 720 element primary projector measuring 2.3 m in diameter, with a fundamental resonance in the 11-16 kHz band. Eighty kilowatts of primary pulse power are applied to this array to develop difference frequency radiations in the 500 Hz to 5 kHz band. Half-power beamwidths of the primary and difference frequency radiations are on the order of 2.5 deg. An array of 30 low frequency elements is interleaved in the primary array for reception of the difference frequency echoes as well as for transmission of linear signals in this band. The system has a capability for alternate parametric and linear transmission to enable near simultaneous acquisition of parametric and linear data. A capability for sequentially stepped center frequencies is also provided for near simultaneous frequency response measurements. Shaped pulse (i.e., gaussian, box-car, etc.) as well as variable bandwidth FM pulse operaton is also provided. Mechanical features include mounting on an offshore platform with continuously variable transducer tilt, train, and depth positioning, as well as VDS towing in a spherical fish with rope fairings. Application of the system to environmental acoustics research is also described. (Author)

AD-A094 234/2 PC **A03**/MF **A01**
Ocean Data Systems, Inc., Rockville, MD.
Analysis of At-Sea Performance Prediction Systems.
Technical task rept.,
Charles L. Baker, Edward Morenoff, and Edward W. Ver Hoef. 15 Nov 73, 38p
Contract N00014-73-C-0131

This report analyzes the SIMAS and FLIT acoustic performance systems, under development at the Naval Underwater Systems Center, Newport, Rhode Island, focusing on the degree of commonality of conceptual approach and compatibility of computed results. Where an operational basis for comparison is required, reference is to the ICAPS system currently installed aboard the USS Kitty Hawk (CV-63) and to the Navy Tactical Data System (NTDS). It is concluded that the constraints imposed by existing on-board computer environments and associated administrative procedures preclude the attainment of an at-sea SIMAS capability within a reasonably short timeframe, except where extra Q-20 computers are available outside the NTDS system, and that external design constraints imposed on the FLIT developers have precluded the incorporation of compatible transmission loss physics into this model. (Author)

PAT-APPL-6-186 354 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Directly Modulated Sonobuoy Transmitter Using Surface Acoustic Wave Sensor.
Patent Application,
Michael T. Junod. Filed 10 Sep 80, 15p AD-D008 024/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

Serving as a hydrophone in the lower unit of the sonobuoy, two surface acoustic wave resonators for determining the resonant frequency of two independent oscillators are also used to sense pressure and thus sound. The outputs of the two resonators are mixed and then passed through a low pass filter to provide a low frequency hydrophone output signal and to remove temperature induced signal distortion. A line driver and low cost twin lead transmission line provides the signal to the upper floatation electronic unit of the sonobuoy for conversion to the desired RF carrier frequency. In a single-channel sonobuoy, this signal is multiplied and amplified for transmission to a distant receiver. In a multi-channel sonobuoy, this signal acts as a reference frequency for the frequency synthesizer section of the sonobuoy transmitter. (Author)

PAT-APPL-6-408 970 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Site Occupancy Detector.
Patent Application,
Steve F. Torok, Vincent A. Formica, and George P. Lange. Filed 25 Sep 80, 14p AD-D008 022/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An acoustic system for covertly detecting surface to air missile (SAM) sites by monitoring for noise emitted by the electrical power generated at the sites. The output of a microphone is sharply filtered around 75 Hz and a phase lock loop locks onto the signal and tracks slight deviations. By timing logic, signals of at least 7 minutes duration with interruptions of 10 seconds or less are considered SAM targets. (Author)

PATENT-4 189 701 Not available NTIS
Department of the Navy, Washington, DC.
Hydroacoustic Detection System.
Patent,
Steve F. Torok, Vincent A. Formica, and Jasper Caro. Filed 9 Mar 71, patented 19 Feb 80, 8p AD-D008 029/1, PAT-APPL-122 512
Supersedes PAT-APPL-122 512-71.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of Patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Various types of rivercraft propelled by motor, poling, sculling or paddling are found to generate broadband noise having a superimposed low frequency sinusoidal modulation. To detect the presence of such craft, a hydrophone, tethered in a river from a moored subsurface float is connected to a concealed transmitter located on the bank. The detected audio signal is demodulated and filtered. When classification criteria have been satisfied, a gate opens allowing the demodulation information to be processed by a logic circuit, which, if satisfied, causes the hydroacoustic signal to be transmitted over an RF link to a remote receiver station. (author)

17B. Communication

AD-A094 026/2 PC **A03**/MF **A01**
Bolt Beranek and Newman, Inc., Cambridge, MA.
Development of a Voice Funnel System.
Quarterly technical rept. no. 7, 1 Feb-30 Apr 80, R. D. Rettberg. Jan 81, 30p Rept no. BBN-4564
Contract MDA903-78-C-0356, ARPA Order-3653

This report covers work performed on the development of a high-speed interface, called a Voice Funnel, between digitized speech streams and a packet-switching communications network.

AD-A094 171/6 PC **A11**/MF **A01**
Arinc Research Corp., Annapolis, MD.
Description and Analysis of Trends in CONUS Common Carrier Offerings.
Final technical rept. Jun 79-Nov 80,
R. B. Mead, and R. J. Stark. Nov 80, 238p Rept no. 1370-01-1-2209R
Contract DCA100-79-C-0039
Revision of report dated Jun 80.

This study describes and analyzes trends in CONUS common carrier offerings. It identifies and quantifies factors affecting the cost of future offerings and provides a methodology to update the forecasts as economic scenarios change. Specific offerings considered include those of AT&E, MCI, SPCC, WUI, and RCA. Both terrestrial and satellite communications are included in the analysis. (Author)

AD-A094 182/3 PC **A02**/MF **A01**
Arinc Research Corp., Annapolis, MD.
Description and Analysis of Trends in CONUS Common Carrier Offerings. Executive Summary.
Final technical rept. Jun 79-Nov 80,
R. B. Mead, and R. J. Stark. Nov 80, 16p Rept no. 1370-01-1-2209R-ES
Contract DCA100-79-C-0039
See also AD-A094 171.

This study describes and analyzes trends in CONUS common carrier offerings. It identifies and quantifies factors affecting the cost of future offerings and provides a methodology to update the forecasts as economic scenarios change. Specific offerings considered include those of ATE, MCI, SPCC, WUI, and RCA. Both terrestrial and satellite communications are included in the analysis. (Author)

AD-A094 217/7 PC **A03**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Solid Shield '79 Common-User Dial Communications, Application of Telephone Switchboard SB-3614(V)/TT Aboard USS SHREVEPORT (LPD 12) for Direct-Dial Ship-Shore Radio.
Final rept.,
E. J. Reynolds. 1 Dec 80, 30p Rept no. NOSC/TR-524

Observations were made of automated (direct-dial) ship-to-shore communications in connection with the Solid Shield '79 exercise 10-21 May 1979. Various equipments were installed aboard USS SHREVEPORT (LPD 12) to form one AN/VCC-2 multichannel (MUX) radio of rf trunk, on a common-user shared basis. This shipboard direct-dial/MUX radio system interfaced with one Marine Corps shore system, which provided access to the entire Solid Shield network. Full operational ship-shore trunking capability was available throughout the exercise. (Author)

AD-A094 262/3 PC **A02**/MF **A01**
Comsat Labs., Clarksburg, MD.
Maintenance Support for DARPA SATNET Packet Communications System.
Quarterly technical rept. 15 Jun-15 Sep 80,
J. Kaiser. 30 Sep 80, 7p Rept no. CL/TSLAP-80-9
Contract MDA903-80-C-0517, ARPA Order-3744

One of the tasks in the maintenance work for the SATNET system is to build a spare PSP terminal to be used in the maintenance depot for checkout of failed and/or repaired units, and for the training of the maintenance personnel. Rather than duplicating the configuration of the terminals in the field, it was decided to reconfigure this terminal for added reliability and reduction in cost. This configuration will, of course, be completely compatible with the terminals in the field. (Author)

AD-A094 266/4 PC **A03**/MF **A01**
Naval Underwater Systems Center, New London, CT. New London Lab.
Performance of the Optimum and Several Suboptimum Receivers for Threshold Detection of Known Signals in Additive, White, Non-Gaussian Noise.
Technical rept.,
Raymond F. Ingram, and Robert Houle. 24 Nov 80, 42p Rept no. NUSC-TR-6339

The optimum and several suboptimum receivers for the detection of known signals in additive, white, non-Gaussian noise are identified. The performance of these nonlinear receivers is parametrically compared with the optimum Gaussian receiver using Middleton's Class B Noise Model. The performance of the extremely low frequency (ELF)

receiver for the Propagation Validation System is shown to be within 0.5 dB of the optimum for high-level ELF noise. (Author)

AD-A094 275/5 PC **A04**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Digital Processing of Speech Materials: A Critical-Band-Based Model of Speech Perception.
Master's thesis,
Robert D. Celmer. 16 Jul 80, 61p Rept no. ARL/PSU/TM-80-180
Contract N00024-79-C-6043

Existing literature suggests that the hearing mechanism deals with incoming speech material by filtering the signals into a series of frequency bands. The width of these bands has been referred to as the critical band that is the perceptual frequency bandwidth observed in a variety of psychoacoustic contexts. Digital processing techniques have been developed for altering available recorded speech materials so that the frequency resolution available in the resultant stimuli may be controlled. Tapes have been produced wherein the frequency bandwidth resolution is limited to no better than one critical band and these tapes have been used in intelligibility testing. Some existing research indicates that the critical band is significantly widened in many individuals with sensorineural hearing loss of cochlear etiology. The digital processing routines described above were also used in developing tape recorded materials with bandwidth resolution limits considerably wider than the normal critical band. The bandwidths chosen for this stage of the digital processing were based on empirical observations of the critical band of sensorineural hearing impaired patients. These recordings were also used in intelligibility testing with normal listeners. Implications of these studies for the clinical measurement of speech intelligibility will be discussed. (Author)

AD-A094 598/0 PC **A07**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Parametric Simulation of Tactical Single Channel Frequency Modulated Communications.
Master's thesis,
Philip Andrew Olson, Jr. Sep 80, 149p

This thesis presents a stochastic simulation model of single channel FM communications that is designed to be used in conjunction with the Simulation of Tactical Alternative Responses (STAR) Combat Model. The communications modelled, the assumptions made, and the interface requirements necessary for inclusion of the communications model in the STAR Combat Model are explained in detail. The computer code that is used to execute the Communications Model is included in the appendices. An overview is given of those portions of the basic STAR Model with which the Communications Model interfaces directly to provide the reader with sufficient background for the discussion of the Communications Model. The communications input requirements of the model, a definition of the purpose of each routine and event, and definitions of each global variable, set, and entity are provided so that this thesis can serve as a user's manual for the Communications Model. (Author)

AD-A094 602/0 PC **A05**/MF **A01**
RAND Corp., Santa Monica, CA.
Effects of the Use of Millimeter Waves on the Statistics of Writer-to-Reader Delays in Military Communications Systems,
W. Sollfrey. Dec 80, 97p Rept no. RAND/R-2633-AF
Contract F49620-77-C-0023
See also Rept. nos. R-1936-RC, AD-A039 485 and RAND/R-2473-AF, AD-A080 522.

The present report conducts an extensive statistical analysis of delays in the AUTODIN I communications system. It determines how rain-induced outages in millimeter-wave earth-satellite links could affect the interstation transit delay and the total delay. Results are given for delays during rain periods and on an annual average basis. This research evaluates the effects of millimeter waves in the proper context, by comparing them with other delay effects in the communications system. It should be of interest to analysts in the Air Force Communications Command, the Directorate of Space Systems and Command, Control, and Communications, and the Army Communications Command; to other government agencies concerned with satellite communications; and to groups involved in spectrum planning and management and future communications technology.

N79-77561/5 PC **A10**/MF **A01**
ECON, Inc., Princeton, NJ.
A Study of the Benefits and Cost-Effectiveness of Satellite-Aided Communications for Emergency Medical Services, Fighting Forest Fires and Pickup and Delivery Trucking Applications.
Final rept.
27 Apr 79, 212p ECON-79-293-1, NASA-CR-158548
Contract NASw-3047

The study entails an investigation of the benefits and costs of improved communication systems for a selected set of land-based operations involving the use of mobile or transportable communication terminals. The specific operations studied are the use of telecommunications in emergency medical services, fighting forest fires, and interstate pickup and delivery trucking. This study has three objectives. The first is to estimate the economic and social benefits of improved communications in each of the three applications. The second objective is to estimate the cost effectiveness of satellite-aided communication systems in comparison with alternative terrestrial communication systems that can provide essentially the same capability. The third objective of this study is to estimate the market for improved communication services in the three applications.

PAT-APPL-6-144 811 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Automatic Exposure Control for Pulsed Active TV Systems.
Patent Application,
Larry A. Thomas. Filed 7 May 80, 17p AD-D008 026/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An automatic exposure control system is disclosed for TV cameras, particularly those of the active type wherein a pulsed light source provides scene illumination for the camera. The control system includes a major control loop wherein an instantaneous photocathode current signal is time-separated from the total sensor signal of an image tube and integrated to provide a real-time measure of the total instantaneous light input upon the photocathode of the tube. When the total light input reaches a predetermined exposure level, a pulse is generated for gating off the image tube via a high voltage supply therefor so that a constant effective exposure is provided the photocathode. Peak levels of the photoelectron current are used to vary the amount of light entering the system and a conventional video detector is included to regulate the photocathode voltage thereby permitting a relatively constant video output signal to be maintained throughout a wide range of input light conditions. (Author)

PAT-APPL-6-200 283 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Data Bus System Utilizing FM Communication Techniques.
Patent Application,
William F. Leahy. Filed 24 Oct 80, 16p AD-D008 042/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A data bus system utilizing a linear FM transmitter and receiver to provide a multiple data channel bus system. A transmission line is utilized to connect the transmitter to the receiver. The modulation index of the FM circuit is modified by varying either the frequency deviation or the modulation frequency. (Author)

PAT-APPL-6-201 583 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Frequency Shift Keying Data Bus Communication System.
Patent Application,
William F. Leahy. Filed 29 Oct 80, 11p AD-D008 041/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A data bus system utilizing a frequency shift keying transmitter and receiver to a multiple channel data bus communication system. A transmission line is utilized to connect the transmitter unit to the receiver unit. The frequency shift keying transmitter unit utilizes binary logic levels which drive a voltage controlled oscillator to generate different frequencies for different logic levels and a zero crossover which is used to avoid generation of harmonics during transmission. (Author)

PAT-APPL-6-201 854 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Modified Pulse width Modulation Data Bus Communication System.
Patent Application,
William F. Leahy. Filed 29 Oct 80, 12p AD-D008 043/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A data bus system utilizing a modified pulsewidth modulation transmitter and receiver to transfer data signal therebetween. A hardened transmission line is utilized to connect the transmitter unit to the receiver unit. A zero crossover switch unit in the transmitter is controlled by a clock signal to switch a reference sinewave at the input data rate. (Author)

PATENT-4 228 422 Not available NTIS
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
System for a Displaying at a Remote Station Data Generated at a Central Station and for Powering the Remote Station from the Central Station.
Patent,
J. C. Perry. Filed 30 Nov 78, patented 14 Oct 80, 9p N81-14221/8, PAT-APPL-965 367
Supersedes PAT-APPL-965 367-78, N79-14308 (17 - 05, p 0590).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A system for displaying at a remote station data generated at a central station and for powering the remote station from the central station is presented. A power signal is generated at the central station and time multiplexed with the data and then transmitted to the remote station. An energy storage device at the remote station is responsive to the transmitted power signal to provide energizing power for the circuits at the remote station during the time interval data is being transmitted to the remote station. Energizing power for the circuits at the remote station is provided by the power signal itself during the time this signal is transmitted. Preferably the energy storage device is a capacitor which is charged by the power signal during the time the power is transmitted and is slightly discharged during the time the data is transmitted to energize the circuits at the remote station.

PATENT-4 234 971 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Precise RF Timing Signal Distribution to Remote Stations.
Patent,
G. F. Lutes, Jr. Filed 24 Sep 79, patented 18 Nov 80, 4p N81-14186/3, PAT-APPL-6-078 521
Supersedes PAT-APPL-6-078 521, N79-34013 (17-24, p 3284). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A method and apparatus are disclosed for distributing a stable reference frequency from a hydrogen maser frequency standard, or similar RF source, to remote stations over great distances with very good phase stability, and with constant amplitude, at each distribution point using a light beam carrier. A technique for providing automatic

gain control at an optical receiver with phase stability in the RF reference is provided.

PATENT-4 238 772 Not available NTIS
Department of the Air Force, Washington, DC.
Image Enhancement Using On-Line Spatial Filtering,
Patent,
Henning E. von Gierke, and Mark W. Cannon, Jr.
Filed 9 Dec 80, 6p AD-D008 057/2, PAT-APPL-6-064 337
Supersedes PAT-APPL-6-064 337.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A scene is scanned line-by-line with a video camera transforming the spatial distribution of intensities present in the scene into a time-varying intensity function which is then filtered in real time. The time-varying function is passed through an electrical filter with adjustable passband and center frequency, and the filtered image is written on a storage tube or other suitable fast-memory array. The stored image which has been spatially filtered in the x direction is then scanned and read line-by-line (in the y direction) with the new scan lines perpendicular to the direction in which the image was written on the storage tube (or memory array). This transforms the spatial distribution of intensities on the storage tube (or memory array) into a time-varying function of intensities. This time-varying function is then passed through a second filter with adjustable passband and center frequency. The now doubly filtered image is displayed on a monitor, and represents the initial image spatially filtered on both x and y directions, with filter passbands and center frequencies chosen by the observer. (Author)

PB81-139560
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Polymers and Surfaces at the Post Office,
W. D. Bascom. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p286-288, 30 Jun 80.

No abstract available.

PB81-144370 PC **A04**/MF **A01**
National Bureau of Standards, Washington, DC. Inst. for Computer Sciences and Technology.
GRIDNET.
Interim rept.,
Raymond T. Moore. Oct 80, 75p NBSIR-80-2149
Sponsored in part by Defense Nuclear Agency, Washington, DC.

This report describes a highly reliable and survivable digital data communication system. It is based on the multiple interconnection of dual fiber optic loops, with up to about twenty data communications stations being served by each dual loop. The dual loop configuration is called CROSSFIRE. The interconnection of many of these to form a large network is called GRIDNET. The network is highly connected and many alternate routes are available for transmitting a message between two stations located at different points on the network. The intelligence required for the control of communications and the routing of traffic is distributed among a number of data communication nodes called gateway stations. Network survival is not dependent on the survival of any node or link, but requires instead that the network not be fragmented.

PB81-146664 CP **T06**
Federal Communications Commission, Washington, DC. Data Automation Div.
Land Mobile Base Station Data Base.
Data file,
Bill Lannin. Jan 81, mag tape FCC/DF-81/003
Supersedes Rept. no. FCC/DF-80/008, PB80-196413.
Source tape is in EBCDIC character set. Tapes can be prepared in most standard 7 or 9 track recording modes for one-half inch tape. Identify recording mode desired by specifying character set, track, density, and parity. Call NTIS Computer Products if you have questions. Price includes documentation, PB-295 974.

The file contains data provided by common carrier in the land Mobile Base Station Industry. The data is categorized under three phases: pending, under construction, and licensed. Each applicant/communication system is described according to ownership, location data, antenna data, transmitter data, and then relationship(s). The system generates Construction Permits, Station File Jackets, Licenses, and a monthly Data Base Listing.

PB81-802548 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vocoders. 1964-November, 1980 (Citations from the NTIS Data Base).
Rept. for 1964-Nov 80.
Jan 81, 201p
Supersedes PB80-801665, and NTIS/PS-78/1056.

Government-sponsored research reports are cited on the design and application of vocoders in speech processing and related subjects. Studies relating to linear predictive vocoding, pitch discrimination, delta modulation, voice digitizers, phase vocoding, and acoustic convolvers are included. (This updated bibliography contains 194 citations, 19 of which are new entries to the previous edition.)

PB81-802555 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Vocoders. 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for 1970-Nov 80.
Jan 81, 178p
Supersedes PB80-801673, and NTIS/PS-78/1057.

This bibliography of worldwide journal literature cites reports on the design and application of vocoders in speech processing. Studies relating to linear predictive vocoding, pitch discrimination, delta modulation, voice digitizers, and acoustic convolvers are included. (This updated bibliography contains 171 citations, 15 of which are new entries to the previous edition.)

17D. Electromagnetic and Acoustic Countermeasures

AD-A094 435/5 PC **A07**/MF **A01**
Army Command and General Staff Coll., Fort Leavenworth, KS.
The Effects of Soviet Army Communications Jamming on the AIM Division Signal Battalion.
Master's thesis,
John R. Williamson. 6 Jun 80, 136p AD-E750 057

This study attempts to show that the U.S. Army AIM division signal battalion can not provide reliable communications support when confronted with the current Soviet radioelectronic combat threat. The investigation is centered on the fact that the division maneuver commanders are not familiar with the difficulties and complexities of the communications-electronics mission in an electronic warfare environment and currently rely too heavily on electronic communications to maintain command and control on the battlefield. The AIM division signal battalion mission and its current radio systems are explained in detail. The doctrine, equipment, and known capabilities of the Soviet communications jamming organizations are examined. Recent computer based technical analyses of the effectiveness of the Soviet radioelectronic combat threat on division level communications is presented. The author concludes that current AIM division signal battalions would not be able to maintain reliable commnand and control communications systems on the modern electronic battlefield when confronted with the full effects of the Soviet radioelectronic combat threat. (author)

17E. Infrared and Ultraviolet Detection

AD-A094 189/8 PC **A05**/MF **A01**
Washington Univ., St. Louis, MO. Semiconductor Research Lab.
Gallium Arsenide Waveguide Detector Array for Electronic Warfare Support Measure Systems.
Final rept. 1 Jul 79-30 Jun 80,
C. M. Wolfe, and G. F. Shade. 29 Aug 80, 88p
Rept no. 64382-1
Contract N00014-79-C-0572

This report presents the results from a study of a waveguide detector array implemented on GaAs. Each component of the array is developed to provide a model for determining the array operation. The fabrication procedures are then discussed in some detail. Each process step is described and the results evaluated. The finished array is then tested. Several measurements are made to determine the response characteristics, dynamic range, crosstalk, and device uniformity. The results of these measurements are then analyzed and comments made on the potential uses of this device. (Author)

AD-A094 329/0 PC **A02**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
An Infrared Sensor Designed to Measure the Diffuse Zodiacal Light,
T. Murdock, P. Tandy, R. Walters, and D. Wang.
1980, 7p Rept no. AFGL-TR-0012
Pub. in Proceedings of the Society of Photo-Optical Instrumentation Engineers, v245 p9-13 Jul 80.

No abstract available.

PB81-857047 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ultraviolet Detectors. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 124p NERACUSGNT2555
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover the development and testing of ultraviolet detectors. Also discussed are new techniques materials for ultraviolet detection. Detection of extreme ultraviolet radiation, and vacuum ultraviolet atomic emission detectors are also included in this bibliography. (Contains 105 citations, fully indexed and including a table of contents.)

17G. Navigation and Guidance

AD-A094 071/8 PC **A04**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Conflict Monitoring Analysis of Parallel Route Spacing in the High Altitude CONUS Airspace. Volume I.
Interim rept.,
Arthur P. Smith, III . Jul 80, 65p MTR-79W00235-VOL-1, FAA-EM-80-16-VOL-1
Contract DOT-FA80WA-4370
See also Volume 2, AD-A094 152.

This work was undertaken as part of the examination of the soundness of the current standards for the spacing between parallel aircraft routes and the enhancement of analytical methods to evaluate future standards. This report describes work completed to date on the Conflict Monitoring Parallel Route Spacing Analysis. This analysis assesses the potential for collision and the controller workload associated with aircraft flying on same direction parallel routes. To assess the potential for collision the analysis considers a conflict alert function similar to that employed in the National Airspace System. The conflict alert function detects pairs of aircraft which are projected to violate the radar separation standard within a given time period. In the analysis the event of a conflict alert is followed by a probabilistic delay and a resolution maneuver characterized by a randomly chosen horizontal turn rate. The controller intervention

rate is estimated by using a simulation. Actual aircraft tracks were sampled from the FAA data base which supports this activity. These tracks are initiated on the routes based on randomly chosen sector entry times which reflect the level of route loading. For both the potential for collision and the intervention rate, trial results based on a subset of the FAA data are given.

AD-A094 073/4 PC **A04**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
Definition of the Problems Associated with Air Traffic Control of Closely Spaced Helicopter Traffic Performing Decelerated Instrument Approaches.
Final technical rept. 17 Sep 79-30 Jun 80,
R. W. Simpson. Dec 80, 67p USAAVRADCOM-TR-79-0282-F
Contract DAAK80-79-C-0282

This study reviews the requirements for a modern, high performance all weather Air Traffic Management and Control (ATM/C) System designed for U.S. Army airfields. A strawman ATM/C system is created to illustrate problems, and to identify research and development needs in surveillance, communications, and computer display and automation.

AD-A094 079/1 PC **A03**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Reliability and Maintainability Evaluation of the Tower Cab Digital Display System.
Final rept. Aug 79-Feb 80,
Arthur R. Moss, and George C. Apostolakis. Dec 80, 48p FAA-CT-80-32, FAA-RD-80-104

A reliability and maintainability evaluation was performed on eight Tower Cab Digital Display (TCDD) systems located at four Florida air traffic control (ATC) facilities. Data were collected between August 25, 1979, and February 29, 1980. Analysis of these data showed that 21 chargeable hardware failures occurred (excluding the telephone lines). This corresponds to an overall system mean-time-between-failures (MTBF) of 1,001 hours and a mean-time-to-repair (MTTR) of 2.9 hours. In addition to the chargeable hardware failures, many system outages which could be attributed to transitory, environmental, or undefined causes occurred. These outages included noisy telephone lines, frequent automatic restarts, and high ambient room temperatures. The measured MTBF for a subset of the system was found to be lower than the corresponding predicted value. The 2.9-hour measured MTTR is considered excessive. Recommended actions for several design changes are included. (Author)

AD-A094 088/2 PC **A02**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Tactical Air Navigation AN/GRN-20C Initial Evaluation Report, Maxwell AFB, Alabama, 12-22 November 1980.
Final rept.,
Felix D. Young, and Arnold N. Dickerson, II. 19 Dec 80, 24p Rept no. 80/66N-236

This report presents the results of the 12-22 November 1980 Traffic Control and Landing Systems (TRACALS) Evaluation of the Maxwell AFB AN/GRN-20C TACAN serving Runway 15. The evaluation was conducted to determine the capabilities and limitations of the system in its installed environment. Results presented in this report can be used as a guide to anticipated performance until there is a significant change in ground equipment, siting environment, screening, or operational use.

AD-A094 124/5 PC **A04**/MF **A01**
Federal Aviation Administration Technical Center, Atlantic City, NJ.
Discrete Address Beacon System (DABS) Receiver and Air Traffic Control Radar Beacon System (ATCRBS) and DABS Processor Subsystem Tests.
Final rept. Feb-Dec 79,
Leonard H. Baker. Dec 80, 59p FAA-CT-80-11, FAA-RD-80-75

This report describes the subsystem interrogator and processor tests conducted by the Federal Aviation Administration (FAA) Technical Center on the engineering laboratory model of the Discrete Address Beacon System (DABS). These tests were conducted to determine the performance of the multichannel receiver and the Air Traffic Control Radar Beacon System (ATCRBS) and DABS processors. These performance test results supplement the functional subsystem testing performed by Texas Instruments, Incorporated during the factory tests. The results of the receiver tests were used to determine the operating parameters and performance of the monopulse receiver and the operating characteristics of the video quantizer. The ATCRBS reply processor tests identified the static performance and characteristics of the variable parameters in this unit. The DABS reply processor tests defined the performance of the critical elements in the DABS processor. These elements were the video digitizer, the message bit and monopulse processing, and the error detection and correction. Identification and optimization of the characteristics of the variable parameters of this unit were determined. It was concluded that the subsystems tested met the requirements specified in the DABS engineering requirement (ER) FAA-ER-240-26. (Author)

AD-A094 169/0 PC **A04**/MF **A01**
Champlain Technology Industries, Palo Alto, CA.
Evaluation of the Performance of the Remote Area Precision Positioning System (RAPPS).
Final rept. Feb-Oct 80,
E. H. Bolz, and T. E. Scalise. Oct 80, 74p FAA-RD-80-120
Contract DOT-FA75WA-3662

A flight test program was flown within the coverage area of the West Coast Loran-C chain during June and July 1979. These tests were conducted for Loran-C evaluation purposes. The Remote Area Precision Positioning System (RAPPS) was utilized as the data collector and independent positioning system for those tests. This report presents an evaluation of the performance of the RAPPS system under actual test conditions. The RAPPS positioning system is based on DME multilateration and takes advantage of existing TACAN or DME installations. It was found under certain conditions to suffer degradation due to multipath propagation and signal dropouts due to terrain masking. After isolating clearly erroneous measurements, residual ranging errors of 285 ft (1 sigma) were estimated based on available data. The RAPPS data collector was designed to acquire data from two Loran-C receivers, the DME subsystem, an altimeter and a clock. The data collector functioned satisfactorily with a few deficiencies. The foremost deficiency was a lack of precise time-tagging of each individual data element, which caused processing of the Loran-C data to be quite difficult. (Author)

AD-A094 195/5 PC **A22**/MF **A01**
MITRE Corp., McLean, VA. METREK Div.
Automatic Traffic Advisory and Resolution Service (ATARS) Multi-Site Algorithms. Revision 1,
R. H. Lentz, W. D. Love, N. S. Malthouse, D. L. Roberts, and T. L. Signore. Oct 80, 505p MTR-80W00100-REV-1, FAA-RD-80-3-REV-1
Contract DOT-FA80WA-4370

This document presents detailed computer algorithms for programming the Automatic Traffic Advisory and Resolution Service (ATARS), formerly known as IPC, within a multi-site Discrete Address Beacon System (DABS) network. This document is to be used by Federal Aviation Administration to specify and define the ATARS portion of the integrated DABS/ATARS system. The FAA has directed that the Conflict Indicator Register (CIR) be replaced by the Resolution Advisory Register (RAR) as the avionics mechanism for coordinating resolution advisories between ATARS sites and between ATARS and BCAS. Since it will be some time before the RAR can be fully incorporated into the ATARS algorithms, a number of modifications have been made to the ATARS logic which will permit testing of the rest of the ATARS design, while eliminating the special CIR message requirements, now obsolete, upon the DABS sensor. These modifications constitute Revision 1 to the original MITRE technical report on the ATARS multi-site algorithms. (Author)

AD-A094 233/4 PC **A04**/MF **A01**
Pacific-Sierra Research Corp., Santa Monica, CA.
An Integral Equation Approach to the Propagation of Low-Frequency Ground Waves Over Irregular Terrain: 1. Ground-Based Terminals.
Interim rept. Apr 78-Oct 79,
S. Gayer, E. C. Field, Jr., and B. D'Ambrosio. Nov 80, 72p PSR-929, RADC-TR-80-334
Contract F19628-78-C-0088

Developing a highly accurate method of predicting the arrival time of a LORAN pulse traveling as a ground wave, this report considers the one dimensional integral-equation method of analyzing propagation over irregular terrain. Numerical calculations and theoretical developments demonstrate how topography and various approximations affect the calculated propagation of a ground wave. We find that curvature effects entering through geometric terms of the integral equation for the propagation of phase work strongly, but that those entering through a modified impedance condition are insignificant. Dispersion of the pulse can cause cycle ambiguity in the signal. For a ground conductivity of 0.001 mho/m, cycle ambiguity appears at a distance from the transmitter of roughly 1500 km. Extensive numerical results are presented for generic terrain types selected to illustrate salient features of solutions to the integral wave equation. Results for simple hills show that arc-length correction of the propagation path is insignificant compared with geometric effects on phase speed in predicting phase retardation. Isolated terrain features cause large local perturbations in phase arrival; far beyond the irregularity on the propagation path, effects are observable but diminish with distance. The one dimensional version of the integral wave equation can over state the effect of terrain features that are localized in the direction transverse to the great-circle propagation path. (Author)

AD-A094 288/8 PC **A03**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Precision Approach Radar, AN/FPN-62. Initial Evaluation Report, Sheppard AFB, Texas, 9-14 November 1980.
Final rept.,
Jaime C. Caballero, Jr., and Larry O. Nowak. 30 Dec 80, 40p Rept no. 80/66R-235

This report presents data collected 9-14 November 1980 to define the capabilities and limitations of the PAR facility at Sheppard AFB, Texas. This report includes descriptions of the useable PAR coverage and tracking capabilities, analysis of all flight and equipment performance data for the system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author)

AD-A094 320/9 PC **A02**/MF **A01**
Facility Checking Squadron (1866th) (AFCS), Scott AFB, IL.
TRACALS Evaluation Report. Precision Approach Radar, AN/FPN-62. Initial Evaluation Report, K.I. Sawyer AFB, Michigan, 25 September - 3 October 1980.
Final rept.,
George R. Hurd, and Larry O. Nowak. 30 Dec 80, 24p Rept no. 80/66R-229

This report presents data collected 25 September - 3 October 1980 to define the capabilities and limitations of the PAR facility at K.I. Sawyer AFB, Michigan. This report includes descriptions of the useable PAR coverage and tracking capabilities, analysis of all flight and equipment performance data for the system. The data presented can be used as a guide for anticipated equipment performance until there is an addition, deletion, or relocation of equipment, or until a significant change occurs in the horizontal profile. (Author)

AD-A094 465/2 PC **A07**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Estimation and Statistical Averaging Applied to Redundant Strapped Down Inertial Sensors for Navigation and Flight Control.
Final rept. 1 Aug 78-1 Feb 80,
Jack W. Bell. Sep 80, 143p Rept no. AFWAL-TR-80-1088

The concept of providing inertial data to satisfy onboard avionic functions from an integrated, strapped down, redundant inertial sensor reference system is presently receiving attention for military and commercial aircraft applications. Strapped down inertial sensors are well suited for flight control. However, in the highly dynamic environment of high-performance aircraft, the present accuracy provided by strapped down inertial reference systems (IRS) is insufficient to meet navigation and weapon delivery requirements. Performance improvement of an IRS employing redundant strapped down inertial sensors of specified ensemble is the subject of this study. Two techniques to improve the performance are considered. One technique is to combine all redundant data from non-failed sensors, through a statistical average, into a orthogonal-triad inertial reference frame. This is accomplished by weighted-least-squares averaging. A second technique is the use of an improved gyro and accelerometer output and output-rate estimation scheme. Estimation algorithms are developed using Kalman Filter theory, and evaluated in a highly dynamic environment. Least-squares averaging of the redundant sensor data can significantly improve the navigation system performance. However, sensor misalignment errors must be minimized such that they are not the dominant sensor error source.

AD-A094 595/6 PC **A04/MF A01**
Naval Postgraduate School, Monterey, CA.
Analysis of Random Errors in Horizontal Sextant Angles.
Master's thesis,
Gerald B. Mills. Sep 80, 73p

The three-point sextant fix has been used for the horizontal positioning of vessels in nearshore hydrographic surveys since 1775. However, this method has only recently been modeled mathematically. The accuracy of the three-point fix depends on the magnitude of the random and systematic errors in the angle measurements and the fix geometry. The random errors in horizontal sextant measurements were investigated by analyzing over 1400 angles, both at sea and on land. These random errors were found to vary with the clarity of the signals being observed, the stability of the vessel and the experience of the observer. The upper and lower bounds for one standard deviation were found to be about 2.7 and 0.6 minutes of arc respectively. In addition, angular differences due to the direction of rotation of the micrometer drum were examined as well as the variability in the determination of sextant index error. (Author)

17H. Optical Detection

AD-A094 145/0 PC **A06/MF A01**
Army Electronics Research and Development Command, White Sands Missile Range, NM. Atmospheric Sciences Lab.
Qualitative Description of Obscuration Factors in Central Europe.
Final rept.,
Marvin D. Kays, Mary Ann Seagraves, Hubert H. Monahan, and Robert A. Sutherland. Sep 80, 123p Rept no. ERADCOM/ASL-MONO-4

This report qualitatively describes, in elementary terms, the obscuration factors that affect electro-optical (E-O) systems. The obscuration factors are classified into four categories: clear atmosphere, natural obscurants, battlefield obscurants, and land/air interface. Basic radiation laws, Rayleigh and Mie scattering, and the changes that a beam of electromagnetic energy encounters in an atmosphere free from clouds and obstructions to visibility are discussed in the chapter on the clear atmosphere. The effects of fog, rain, snow, drizzle, clouds, haze, and dust storms upon E-O systems are discussed in the chapter on natural obscurants. Battlefield obscurants are dust, smoke, and fire resulting from battle and intentional smoke. The chapter on land/air interface discusses the effect of terrain, vegetation, and ground cover upon obscuration. (Author)

AD-A094 427/2 PC **A03/MF A01**
Human Engineering Lab., Aberdeen Proving Ground, MD.
A Computer Simulation Model of Outdoor Radiant Lighting.
Final rept.,
Christopher C. Smyth. Jul 80, 46p Rept no. HEL-TN-10-80

A deterministic computer model of outdoor daytime (nighttime) radiant lighting is described for a clear sky and slight ground-level haze. Equations are developed for the radiance at an observer's position, which is emitted from a target and the surrounding background. The equations are a function of the positions of the sun (moon), the target and the observer. The equations include the effects of atmospheric attenuation, the background sky light, and the ground cover. The computer model was developed for use in simulation studies of target visibility. (Author)

AD-A094 440/5 PC **A08/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
The Application of Two Dimensional Moment Invariants to Image Signal Processing and Pattern Recognition.
Master's thesis,
Tyle T. Kanazawa. Dec 80, 153p Rept no. AFIT/GEO/PH/80-7

This thesis investigates the application of two-dimensional moment invariants to image pattern recognition. The general problem studied is how to identify an aircraft target and its orientation in real time. The method of moment invariants provides a clever feature extraction technique to reduce the information in an image to a finite number of quantities which are translation, size, and rotation independent.

PATENT-4 236 819 Not available NTIS
Department of the Air Force, Washington, DC.
Imagery with Constant Range Lines.
Patent,
Leland D. Green. Filed 29 Jul 74, patented 2 Dec 80, 8p AD-D008 052/3, PAT-APPL-494 009 Supersedes PAT-APPL-494 009-74.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Method and apparatus for showing the relative range from an active line scan sensor to a target, the changes in range being shown on a recording medium as an alternate series of bright and dark lines. In particular, a modulated laser beam having high frequency components is utilized to illuminate the target, the reflected energy received at the sensor having the same modulation frequency but phase modified by the transit time required to make the roundtrip from the sensor to the target and return. The phase difference between the received energy and the transmitted, or reference, energy is shown on the recording medium by directing a portion of the reference energy to a detector which is also responsive to the received energy. Points in the image formed on the recording medium where the phase angles are the same can be made to appear white while the points where the phase angles differ by 180 deg can be made to appear black. The difference in the range between two black lines is equal to a specific subinterval of the wavelength of the effective laser modulation frequency, the sub-interval being 1/n where n is the harmonic of the effective laser modulation frequency.

PATENT-4 239 388 Not available NTIS
Department of the Air Force, Washington, DC.
Time Domain Laser Reconnaissance Technique.
Patent,
Leland D. Green. Filed 29 Jul 74, patented 16 Dec 80, 7p AD-D008 060/6, PAT-APPL-494 008 Supersedes PAT-APPL-494 008-74.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Method and apparatus for producing imagery of an object having distinct vertical geometry characteristics located at a reference plane remote from a scanning laser. In particular, a laser beam is utilized to scan objects at the reference plane and the optical signal reflected therefrom, corresponding to the reflectivity of the objects and background, is detected. An electrical signal, corresponding to the detected reflectivity signal, is coupled to an RF amplifier, the output of the RF amplifier being applied to an amplitude demodulator. The output of the amplitude demodulator, corresponding to the reflectivity and vertical geometry characteristics of the object at the reference plane, is applied to a recording device to produce the aforementioned imagery. (Author)

PATENT-4 240 745 Not available NTIS
Department of the Air Force, Washington, DC.
Imagery with Constant Range Lines.
Patent,
Leland D. Green. Filed 29 Jul 74, patented 23 Dec 80, 7p AD-D008 062/2, PAT-APPL-494 007 Supersedes PAT-APPL-494 007-74.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

Method and apparatus for showing the relative range from an active line scan sensor to a target, the changes in range being shown on a recording medium as an alternate series of bright and dark lines. In particular, a modulated laser beam having high frequency components is utilized to illuminate the target, the reflected energy received at the sensor having the same modulation frequency but phase modified by the transit time required to make the roundtrip from the sensor to the target and return. The phase difference between the received energy and the transmitted, or reference, energy is detected by a phase demodulator, the detected phase difference corresponding to range contour lines. A reflectivity signal corresponding to the reflectance of the target is also provided. The range contour and reflectivity signals can be simultaneously recorded on a recording medium. Alternately, the reflectivity signal may be gated by the range contour signal producing a composite image on the medium. (Author)

17I. Radar Detection

AD-A094 065/0 PC **A03/MF A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Trapped Radiation Effects on the Space-Based Radar.
Project rept.,
David M. Towle. 14 Oct 80, 46p SBR-2, ESD-TR-80-215
Contract F19628-80-C-0002, ARPA Order-3724

This report presents the results of a parametric study regarding the influence of radiation damage effects on possible configurations of a phased array Space-Based Radar System. Primary emphasis is on Van Allen type trapped radiation effects on solar cells and on the antenna transmitter/receiver modules. Qualitative references to man-made nuclear radiation effects are also given. It is concluded that weight penalties for shielding against trapped radiation effects are sufficiently high in the intermediate altitude regime, 2,000 to 9,000 km altitude, to drive the design choices to higher or to lower altitude regimes. (Author)

AD-A094 104/7 PC **A02/MF A01**
Rome Air Development Center, Griffiss AFB, NY.
Prediction of Electromagnetic Scattering for Rough Terrain Using Statistical Parameters Derived from Digitized Topographic Maps.
R. J. Papa, J. F. Lennon, and R. L. Taylor. Sep 80, 25p Rept no. RADC-TR-80-289

For terrain which is gently undulating and whose surface height excursions are large compared to a wavelength, well known formulas for the normalized bistatic cross section as a function of the polarization states of the incident and scattered EM waves are available in the literature. There are also several theoretical models which describe the EM scattering cross section of surfaces characterized

by two scales of roughness. The present analysis applies parameter estimation techniques to a digitized topographic data base. The results are used in a hypothesis test to determine the best probability density function (PDF) for the given map data. The accuracy of the analysis depends on the available data, the estimators employed, and the determination of appropriate PDF's. The example which will be discussed consists of a large number of terrain regions in an area of eastern Massachusetts. This area was chosen because experimental data in the form of electromagnetic forward scattering from the surface are available. Because of the number of cases involved, the complexity of the multivariate height distributions, and the type of measurements available, only a single observation of the multivariate data is used in the present analysis. The results of the statistical analysis for mean height, variance, correlation, PDF, and a geologic feature characterizing each subregion are presented.

AD-A094 137/7 PC **A03**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
Estimation of the Zone of Detection of the Single Wire Individual Resource Protection Sensor.
Technical rept.,
J. Leon Poirier. Aug 80, 50p Rept no. RADC-TR-80-258

The response of an RF intrusion detection system which makes use of a leaky coaxial cable sensor is analyzed. The system consists of a length of leaky cable encircling the protected resource, which acts as a distributed transmitting sensor. A centrally-located monopole serves as a receiving element. When an intruder approaches the leaky cable sensor, the field is disturbed, the received signal changes, and if the change is sufficiently large, a detection is declared. It is shown that for most system applications the amplitude of the signal scattered out of the leaky coaxial cable field by the intruder may be assumed to vary inversely with the distance of the intruder from the cable. The responses of the system with this field variation assumed are computed for several intrusion paths and agree well with observations. The probability of detection PD and zone of containment ZC are calculated for two receivers, one with an envelope detector and another with a quadrature detector. The uniformity of the PD and ZC along the cable are examined as a function of the cable constants. It is shown that optimal performance is obtained with a leaky cable sensor whose coupling coefficient is increased along the sensor to compensate for the loss in signal due to cable attenuation. (Author)

AD-A094 177/3 PC **A03**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Active Beacon Collision Avoidance System (BCAS) Functional Overview,
J. D. Welch, and V. A. Orlando. 17 Dec 80, 44p ATC-102, FAA-RD-80-127
Contract DOT-FA72WAI-817

The Active Beacon Collision Avoidance System (BCAS) is a beacon-based airborne collision avoidance system that provides for cooperative threat resolution between BCAS and conflicting aircraft and coordination with the ground ATC control function through the DABS data link. All beacon-equipped aircraft in the vicinity of the BCAS are detected. ATCRBS-equipped aircraft are interrogated using a special Mode C interrogation, DABS aircraft are initially detected passively. Those aircraft that represent a possible threat are discretely interrogated to maintain a range/altitude track. This document provides a functional overview of BCAS including operational features, a description of the avionics package, and examples of surveillance data obtained with experimental BCAS equipment. The results show that reliable surveillance performance is achieved in low and medium density airspace. (Author)

AD-A094 181/5 PC **A07**/MF **A01**
Computer Sciences Corp., Huntsville, AL.
Signal Processor for Binary Phase Coded CW Radar.
Technical rept.,
B. K. Bhagavan. Dec 77, 131p Rept no. CSC/TR-77/5491
Contract DAAH03-75-A-0045

This report documents a study of signal processors for a binary phase coded CW radar, where a maximum-length shift register-generated sequence is used for phase modulation. Following a brief review of phase coded CW radars and the problems associated with such radars, several analog, digital and hybrid signal processor configurations are proposed. The advantages and drawbacks of each configuration are discussed. In order to evaluate the performance of the proposed processors, digital computer simulations of the input signal and the processors are developed. These simulations are used to demonstrate the feasibility of digital processing in spite of the large dynamic range. (Author)

AD-A094 231/8 PC **A05**/MF **A01**
MITRE Corp., McLean, VA.
Forward Area Alerting Radar Data Link. Results of European Tests,
John W. Brosius, III , Stanley R. Hirsch, and Jacob H. Parness. Nov 80, 94p Rept no. MTR-80W261

In the spring of 1980 a joint CORADCOM-MITRE evaluation team joined a Short Range Air Defense (SHORAD) unit in the field to investigate ways for improving the performance of the data link connecting SHORAD weapons teams with the Forward Area Alerting Radar (FAAR). The team conducted over 1000 data transmission tests over a period of seven days using several different antennas and data rates. These tests traversed a variety of ranges and terrain profiles closely representing operational European conditions. Using a MITRE custom-built data link test set and other supporting equipment, bit error rates, error distributions, and signal levels were recorded for each test. Test results demonstrated that the current FAAR data link rate could be tripled with little change in performance. Furthermore, communications to sites with weak reception and high error rates can be substantially improved using the alternative antennas evaluated during the tests. Based on these and other findings MITRE makes specific recommendations to the Army on improving FAAR data link performance. (Author)

AD-A094 330/8 PC **A02**/MF **A01**
Rome Air Development Center, Hanscom AFB, MA. Deputy for Electronic Technology.
Systems Study of Overlapped Subarrayed Scanning Antennas,
Ronald L. Fante. 8 Oct 79, 13p Rept no. RADC/ETR-81-0002
Pub. in IEEE Transactions on Antennas and Propagation, vAP-28 n5 p668-679 Sep 80.

No abstract available.

AD-A094 470/2 PC **A09**/MF **A01**
ITT Gilfillan, Van Nuys, CA.
Commutating Feed Assembly.
Final technical rept. Dec 78-Feb 80,
Ronald I. Wolfson. Jun 80, 176p RADC-TR-80-180
Contract F19628-79-C-0034

The principal activities performed during the Commutating Feed Assembly contract include development of a stripline feed network and non-contacting loop couplers for low-loss transfer and distribution of RF energy. The commutator described not only has superior electrical performance over that of an electronic system, but also offers improvements in reliability and life-cycle cost. It can be accessible located where maintenance actions are more easily carried out than in an electronically-scanned system or a conventional rotating antenna. Non-contacting loop couplers achieve low-loss transfer and distribution of RF energy, with precise control of amplitude and phase that is needed to realize low sidelobe levels. This method of coupling is preferable to the capacitive coupling used in existing electromechanical commutating feeds, where illumination flutter results in unacceptable MTI performance. To obtain multiple beam groups in elevation, two or more commutators may be stacked on a common drive shaft.

AD-A094 581/6 PC **A05**/MF **A01**
Systems Control, Inc. (VT), Palo Alto, CA.
Multitarget Tracking Studies.
Final rept. 5 Oct 79-3 Jun 80 on Phase 1,
Ben Friedlander. Jul 80, 83p Rept no. SCI-5334-01
Contract N00014-79-C-0743

This report presents the results of phase I of an investigation of a new concept for tracking multiple targets. This concept is based on modeling the observed data as a multichannel ARMA process. The parameters of the model provide a compact representation of target parameters such as spectrum and TDOA/bearing. These parameters can, therefore, be used as inputs to a tracking algorithm. In phase I the basic algorithm for single target tracking was developed and tested. Results based on simulations of synthetic data are very promising. Preliminary theoretical analysis of the multichannel case has also been performed. (Author)

PAT-APPL-6-148 890 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Electromagnetic Detection Apparatus.
Patent Application,
Luis C. Barzana. Filed 12 May 80, 18p AD-D008 012/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An electromagnetic detection apparatus for sensing an object, has a transmitter for radiating electromagnetic energy toward the object. The apparatus also has an array of at least three spaced receiving antennas and one parasitic antenna. The parasitic antenna is spaced from and mounted alongside the array. Also included is a phase detection circuit for measuring the phase difference between signals received by one of the receiving antennas with respect to the other two. This apparatus can sense phase difference and correlate it to the azimuthal position of the object. (Author)

PAT-APPL-6-153 467 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Automatic Range Containment System.
Patent Application,
Clyde R. Berry, and Richard A. Dye. Filed 27 May 80, 10p AD-D008 006/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The present invention discloses an automatic range containment system for use in an electric/optical or electromagnetic active 'radar' type sensor to discriminate against background obstructions within a sensor field of view. The system comprises an intrusion timer initiated by a signal received from a target sensor; a containment interval timer initiated by a turn-on pulse; a transmitter oscillator in combination with a clock generating pulses; a range containment timer initiated by the pulses; a range set-back timer in combination with a range gate and a gate; a range counter for counting and totalling a signal passed through the gate; and a digital-to-analog converter converting the signal from the range counter-to-the range containment timer providing a range control causing the system to reduce operational range if the background obstructions appear within the sensor's field of view. (Author)

PAT-APPL-6-183 697 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Scanning Radar System.
Patent Application,
Bernard L. Lewis. Filed 3 Sep 80, 10p AD-D007 996/2
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a scanning radar system having the capability of taking a number of successive looks at the same range and angle resolution cells with several millisecond time intervals between looks. The scanning radar system includes a pulsed transmitter, a receiver, and an array of energy beam radiators having individual beam paths with associated centerlines. A commutator switch and a duplexer sequentially connect a different one of the radiators to the pulsed transmitter at the beginning of each pulse repetition period and to the receiver during the subsequent interval

between pulsed transmissions. A motor rotates the array of radiators as a unit to cause the beam path centerlines to rotate and scan the field of view. A plurality of delay units and a commutator switch are connected to the output of the receiver for processing the pulses returned to each of the radiators from resolution cells in the field of view during the intervals of time between pulsed transmissions to cause the pulses returned to different radiators from the same resolution cell to be in time coincidence.

PB81-139511 (Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Antennas and Propagation Work at FGAN in Germany,
T. C. Cheston. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p274-276, 30 Jun 80.

Research areas include phased arrays, radar antennas, radar camouflage, and millimeter wave propagation.

PB81-854390 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Side-looking Radars. June, 1973-October, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jun 73-Oct 80.
Nov 80, 245p NERACIAANT2421
Sponsored by National Technical Information Service, Springfield, VA.

This bibliography cites literature on the design and operation of side-looking radars. Techniques explored in the design and development of radars include signal processing, antennas, pattern recognition, recording, algorithms for map matching, calibration, maintenance and environmental effects on signal quality. Operations include flight survey aspects, field tests on species identification, coastline definition, and imagery interpretation. Applications include both airborne and some spaceborne radars used for mapping,earth resources, sea ice and icebergs, marine traffic, oil spill surveillance, and search and rescue. (Contains 246 citations, fully indexed and including a table of contents.)

17J. Seismic Detection

AD-A094 355/5 PC **A12**/MF **A01**
Hawaii Inst. of Geophysics, Honolulu.
Lopez Island Ocean Bottom Seismometer Intercomparison Experiment.
Final rept.,
G. H. Sutton, B. T. R. Lewis, J. Ewing, F. K. Duennebier, and B. Iwatake. Oct 80, 273p Rept no. HIG-80-4
Contract N00014-75-C-0209

The purpose of the Lopez Island Ocean Bottom Seismometer Intercomparison Experiment was to determine the effects of coupling and bottom currents on ocean bottom seismometers. Twelve operational OBS's, three specially designed three-component systems, and a hydrophone were compared with each other. Unlike seismometers placed on hard rock at land stations, ocean bottom seismometers can be affected by soft sediments (which act as lossy mechanical springs) and by buoyancy. Coupling through soft sediments can modify the response to ground motion much as a low pass filter does, and high buoyancy tends to counteract this effect. These effects are observed in the Lopez data, which consist of signals from mechanical transient tests, cap shots, airgun pulses, and general background noise. The modification of response is pronounced for some instruments and barely noticeable in others. Instruments that stand high in the water relative to their base width tend to be susceptible to rocking motion that shows up as a mechanical cross coupling between horizontal and vertical motion. Correlation of Lopez results with coupling theory suggests that it is possible to design ocean bottom seismometers that will couple well to any sediment. Current levels at the Lopez site (<5 cm/sec) were too small to produce noticeable effects on any of the instruments; however, the same design criteria that will minimize coupling problems will also lessen problems caused by ocean currents. (Author)

18. NUCLEAR SCIENCE AND TECHNOLOGY

18A. Fusion Devices (Thermonuclear)

AD-A094 043/7 PC **A04**/MF **A01**
JAYCOR, Alexandria, VA.
ECRH Studies on Tokamak Plasmas.
Final rept. 17 Sep 79-30 Sep 80,
Ronald Gilgenbach. 10 Oct 80, 52p Rept no. JAYCOR-PSD-200-80-009FR
Contract N00173-79-C-0472

A summary is provided of electron cyclotron heating (ECH) experiments on the ISX-B (Impurity Studies Experiment-B) Tokamak and the development of electron temperature diagnostics at second harmonic.

AD-A094 103/9 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Critical Elements of High Gain Laser Fusion.
Memorandum rept.,
Stephen E. Bodner. 21 Jan 81, 49p Rept no. NRL-MR-4453

Progress toward high gain laser fusion can be measured by a set of five critical elements. They are the laser-to-fuel coupling efficiency, the cold fuel isentrope, the implosion asymmetry, the ablation pressure, and the ignition concept. (Author)

BNL-28443 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Nuclear Data Requirements for Fusion Reactor Nucleonics.
M. R. Bhat, and M. A. Abdou. 1980, 6p CONF-801011-76
Contract AC02-76CH00016
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

Nuclear data requirements for fusion reactor nucleonics are reviewed and the present status of data are assessed. The discussion is divided into broad categories dealing with data for Fusion Materials Irradiation Test Facility (FMIT), D-T Fusion Reactors, Alternate Fuel Cycles and the Evaluated Data Files that are available or would be available in the near future. (ERA citation 06:004380)

BNL-28561 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Design of Long Pulse/Steady State Negative Hydrogen Ion Sources for Fusion Applications.
K. Prelec. 1980, 4p CONF-801111-23
Contract AC02-76CH00016
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980.

By using parameters of ion sources when operating in a pulsed mode and without cooling (pulse length < 0.1 s), requirements have been determined for a long pulse (several seconds) or steady state operating mode and two sources have been designed and fabricated. First of the two is a penning source, designed for a steady state operation with a cathode power density of 1 kW/cm exp 2 . For the range of cathode power densities between 0.2 kW/cm exp 2 and 1 Kw/cm exp 2 , nucleated boiling has to be used for heat removal; below 0.2 kW/cm exp 2 water flow cooling suffices. Although this source should deliver 0.3 to 0.5 A of H exp - ions in a steady state operation and at full power, the other source, which has a magnetron geometry, is more promising. The latter incorporates two new features compared to first designs, geometrical focusing of fast, primary negative hydrogen ions from the cathode into the extraction slit, and a wider discharge gap in the back of the source. These two changes have resulted in an improvement of the power and gas efficiencies by a factor of 3 to 4 and in a reduction of the cathode power density by an order of magnitude. The source has water cooling for all the electrodes, because maximum power densities will not be higher than 0.2 kW/cm exp 2 . Very recently a modification of this magnetron source is being considered; it consists of plasma injection into the source from a hollow cathode discharge. (ERA citation 06:004381)

CONF-791102-162 PC **A02**/MF **A01**
Science Applications, Inc., Oak Ridge, TN.
Structural Analysis of Magnetic Fusion Energy Systems in a Combined Interactive/Batch Computer Environment.
N. E. Johnson, M. K. Singhal, J. C. Walls, and W. H. Gray. 1979, 5p
Contract W-7405-ENG-26
Symposium on engineering problems of fusion research, San Francisco, CA, USA, 13 Nov 1979.

A system of computer programs has been developed to aid in the preparation of input data for and the evaluation of output data from finite element structural analyses of magnetic fusion energy devices. The system utilizes the NASTRAN structural analysis computer program and a special set of interactive pre- and post-processor computer programs, and has been designed for use in an environment wherein a time-share computer system is linked to a batch computer system. In such an environment, the analyst must only enter, review and/or manipulate data through interactive terminals linked to the time-share computer system. The primary pre-processor programs include NASDAT, NASERR and TORMAC. NASDAT and TORMAC are used to generate NASTRAN input data. NASERR performs routine error checks on this data. The NASTRAN program is run on a batch computer system using data generated by NASDAT and TORMAC. The primary post-processing programs include NASCMP and NASPOP. NASCMP is used to compress the data initially stored on magnetic tape by NASTRAN so as to facilitate interactive use of the data. NASPOP reads the data stored by NASCMP and reproduces NASTRAN output for selected grid points, elements and/or data types. (ERA citation 06:004382)

CONF-800707-24 PC **A02**/MF **A01**
JAYCOR, Del Mar, CA.
Theoretical Studies of EBT.
S. Hamasaki, H. H. Klein, N. A. Krall, J. B. McBride, and J. L. Sperling. May 80, 4p
Contract AC03-80ER53092
International conference on plasma physics and controlled nuclear fusion research, Brussels, Belgium, 1 Jul 1980.

A one-dimensional time dependent model of plasma particle and energy transport was used to predict the performance of an EBT experiment large enough to test confinement scaling in a parameter range (n, T, tau, etc.) close to reactor conditions. Such a device is referred to as EBT-P. The model is based on a computer code which uses the magnetic field lines as the basis for the coordinate system, and so includes some EBT geometrical effects, with neoclassical transport perpendicular to the surfaces of constant pressure. The geometry is self-consistent, i.e., the plasma pressure reacts on the magnetic field. (ERA citation 06:004369)

CONF-801011-66 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Environmental and Safety Issues of the Fusion Fuel Cycle.
J. G. Crocker. 1980, 13p
Contract AC07-76ID01570
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

Group 18A—Fusion Devices (Thermonuclear)

This paper discusses the environmental and safety concerns inherent in the development of fusion energy, and the current Department of Energy programs seeking to: (1) develop safe and reliable techniques for tritium control; (2) reduce the quantity of activation products produced; and (3) provide designs to limit the potential for accidents that could result in release of radioactive materials. Because of the inherent safety features of fusion and the early start that has been made in safety problem recognition and solution, fusion should be among the lower risk technologies for generation of commercial power. (ERA citation 06:004383)

PPPL-1716 PC **A03**/MF **A01**
Princeton Univ., NJ. Plasma Physics Lab.
Compact Torus.
H. P. Furth. Oct 80, 33p
Contract AM02-76CH03073

The objective of the compact torus approach is to provide toroidal magnetic-field configurations that are based primarily on plasma currents and can be freed from closely surrounding mechanical structures. Some familiar examples are the current-carrying plasma rings of reversed-field theta pinches and relativistic-electron smoke ring experiments. The spheromak concept adds an internal toroidal magnetic field component, in order to enhance MHD stability. In recent experiments, three different approaches have been used to generate spheromak plasmas: (1) the reversed-field theta pinch; (2) the coaxial plasma gun; (3) a new quasistatic method, based on the initial formation of a toroidal plasma sleeve around a mechanical ring that generates poloidal and toroidal fluxes, followed by field-line reconnection to form a detached spheromak plasma. The theoretical and experimental MHD stability results for the spheromak configuration are found to have common features. (ERA citation 06:004389)

SAND-80-8236 PC **A03**/MF **A01**
Sandia National Labs., Livermore, CA.
Microstructural Characterization of Autogenous GTA Welds in a 12Cr-1Mo-0.3V Steel.
J. C. Lippold. Oct 80, 33p
Contract AC04-76DP00789

In support of the national fusion energy effort, the weldability of a 12Cr-1Mo-0.3V martensitic stainless steel has been investigated. This alloy is a leading candidate for the first wall/blanket of the ETF (Experimental Test Facility) fusion reactor. The initial investigation has utilized both the continuous cooling transformation diagram and the equilibrium phase diagram to rationalize the microstructures observed in the fusion zone and heat-affected zone of gas tungsten-arc welds. Regions of maximum hardness were observed within the fusion zone and in the coarse-grained region of the heat-affected zone where the predominant microstructural constituent was untempered martensite. Regions of the heat-affected zone which either contained a mixture of untempered martensite and carbides or were not fully reaustenitized during the weld thermal cycle exhibited a lower as-welded hardness. The presence of residual ferrite in an untempered martensite matrix along the weld fusion line also resulted in a localized drop in hardness. The on-heating and on-cooling transformation behavior of the alloy, as determined with the aid of the Gleeble dilatometer, corroborated both the microstructural observations and the hardness data. (ERA citation 06:004390)

UCRL-50021-79(V.1) PC **A13**/MF **A01**
Lawrence Livermore National Lab., CA.
Laser Program Annual Report, 1979.
L. W. Coleman, and J. R. Strack. Mar 80, 285p
Contract W-7405-ENG-48

This volume provides a program overview, presenting highlights of the technical accomplishments of the elements of the program, as well as discussions of program resources and facilities. Also covered are the work of the Solid-State Laser program element, which includes systems operations, Nova, and research and development activities. (ERA citation 06:004391)

UCRL-50021-79(V.2) PC **A15**/MF **A01**
Lawrence Livermore National Lab., CA.
Laser Program Annual Report, 1979.
L. W. Coleman, and J. R. Strack. Mar 80, 331p
Contract W-7405-ENG-48

This volume contains four sections that covers the areas of target design, target fabrication, diagnostics, and experiments. Section 3 reports on target design activities, plasma theory and simulation, code development, and atomic theory. Section 4 presents the accomplishments of the target fabrication group, and Section 5 presents results of diagnostic developments and applications for the year. The results of laser-target experiments are presented. (ERA citation 06:003569)

UCRL-50021-79(V.3) PC **A14**/MF **A01**
Lawrence Livermore National Lab., CA.
Laser Program Annual Report, 1979.
L. W. Coleman, and J. R. Strack. Mar 80, 305p
Contract W-7405-ENG-48

Volume 3 comprises three sections, beginning with Section 7 on advanced quantum electronics. Both theoretical and experimental research and development activities on advanced laser concepts in the quest for high efficiency and high repetition rate are presented. Section 8 contains the results of studies by the Energy and Military Applications group. Section 9 presents results from some of the activities of the advanced isotope separation program. (ERA citation 06:004392)

UWFDM-376 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Maintainability Considerations for the Central Cell in WITAMIR-I, a Conceptual Design of a Tandem Mirror Fusion Power Reactor.
I. N. Sviatoslavsky. Oct 80, 7p CONF-801011-69
Contract AS02-78ET52048
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

The concepts for maintaining the central cell reactor components for WITAMIR-I are described. WITAMIR-I is a conceptual tandem mirror fusion power reactor utilizing thermal barriers designed by the University of Wisconsin-Madison. Unique solutions to the difficult problems of routine blanket replacement and maintenance are proposed. Solutions are also proposed for maintaining the central cell coils and the shield. (ERA citation 06:004395)

UWFDM-377 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Thermal and Mechanical Design of WITAMIR-I Blanket.
D. K. Sze, and I. N. Sviatoslavsky. Oct 80, 9p
CONF-801011-71
Contract AS02-78ET52048
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

The design philosophy of WITAMIR-I, a Wisconsin Tandem Mirror Reactor design study, uses the experience obtained from our previous tokamak studies and combines it with the unique features of the tandem mirror to obtain an attractive design of a TM power reactor. It is aimed at maximizing the strengths of the tandem mirror while mitigating its weaknesses. The end product should be a safe, reliable, maintainable and a relatively economic power reactor. The general description of the reactor, the plasma calculations, the magnet design, the neutronic calculations and the maintenance considerations are presented elsewhere. This paper presents the blanket design of this reactor study. (ERA citation 06:004396)

UWFDM-378 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
LiPb, a Novel Material for Fusion Applications.
D. K. Sze, R. Clemmer, and E. T. Cheng. Oct 80, 10p CONF-801011-70
Contract AS02-78ET52048
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

LiPb in various compositions is a unique material for fusion application, combining the breeding material and neutron multiplier. It provides a high tritium breeding ratio, low tritium solubility and, at the Pb rich end, is relatively inert with water. This paper summarizes the neutronic calculations, the tritium chemistry information, the material compatibility problems and the available material properties. The material compatibility problem may be the most severe problem in using LiPb in a fusion environment. (ERA citation 06:004397)

UWFDM-379 PC **A02**/MF **A01**
Wisconsin Univ.-Madison. Dept. of Nuclear Engineering.
Review of Neutronic Design Criteria.
R. T. Perry, and C. W. Maynard. Oct 80, 5p
CONF-801011-72
Contract AS02-78ET52048
ANS topical meeting on the technology of controlled nuclear fusion, King of Prussia, PA, USA, 14 Oct 1980.

The neutronic design criteria for fusion reactors are reviewed. We found that some values for criteria are poorly fixed. For example, the tritium breeding ratio has often been set unrealistically high with no provisions for adjusting values. We also found that although energy production is the primary reason for a reactor's existence, little effort has been made to maximize it by blanket energy multiplication. Lastly, we suggest that further optimization studies could result in thinner shields. (ERA citation 06:004398)

18B. Isotopes

PB81-145443 Not available NTIS
National Bureau of Standards, Washington, DC.
Mass Spectrometric Isotope Metrology of Uranium on Resin Beads.
Final rept.,
J. D. Fassett, W. R. Kelly, L. A. Machlan, and L. J. Moore. 1980, 8p
Pub. in Proceedings of the ORNL Conference on Analytical Chemistry in Energy Technology, Gatlinburg, TN., October 8-12, 1979, Paper in Radioelement Analysis Progress and Problems, p357-364 1980.

The potential for making high-precision, high-accuracy isotopic ratio measurements on submicrogram amounts of uranium absorbed on anion-exchange resin beads has been investigated utilizing a single stage thermal ionization mass spectrometer with pulse counting detection. The errors inherent in this measurement process has been evaluated.

PB81-149882 Not available NTIS
National Bureau of Standards, Washington, DC.
Liquid Scintillation Counting of Inorganic Radiochemicals in High-Efficiency Scintillators.
Final rept.,
B. M. Coursey, and J. M. Calhoun. 1980, 11p
Pub. in Proceedings of the International Conference on Liquid Scintillation Counting, Recent Applications and Development, San Francisco, CA., August 21-24, 1979, Paper in Sample Preparation and Applications II, p19-29 1980.

Methods of incorporating inorganic radiochemicals into liquid and solgel scintillators that exhibit high scintillation yield are described. Liquid-scintillation measurements have been made at the National Bureau of Standards on 31 different radionuclides for a variety of applications in radionuclide metrology. Sample preparation techniques are described for a number of radionuclides that differ markedly in their chemical behavior as well as in their nuclear-decay characteristics. Particular emphasis given to radionuclides such as (55)Fe and (241)Pu which decay by emission of low-energy radiations.

18C. Nuclear Explosions

AD-A094 074/2 PC **A08**/MF **A01**
SRI International, Menlo Park, CA.

Blast/Fire Interactions: Analysis of Parametric Sensitivity and Large-Scale Experimental Determination of Ignition Thresholds.
Annual rept. 1 Oct 78-31 Mar 80,
Stanley B. Martin, Raymond S. Alger, John R. Rempel, and Peter S. Hughes. Oct 80, 166p
Contract DCPA01-78-C-0279

This report describes activities in three areas of technical services in the research field of blast/fire interactions. Two are concerned with parametric sensitivity in predictive modeling, the third with verification of laboratory ignition thresholds using a large field-test source of intense thermal radiation. Airblast effects are shown to be a major source of uncertainty in assessment of fire effects of a nuclear explosion. Blast caused fires may be more important than primary fires in the regions experiencing lower over-pressures, but current inadequacies in secondary fire modeling severely limit the comparisons. Moreover, airblast extinction introduces very large uncertainties in estimates of initial fire incidence, and blast damage to structures introduces similarly large uncertainties in evaluation of the further destruction from fire spread and possible mass fire development. The large scale ignition experiments generally confirmed laboratory-based predictions. Mixed fuel results were inconclusive.

18D. Nuclear Instrumentation

LBL-10824 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Performance Studies of the New Generation Amperex XP2020 Photomultiplier.
C. C. Lo, and B. Leskovar. Nov 80, 10p CONF-801103-12
Contract W-7405-ENG-48
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

Characteristics have been measured for the new generation Amperex XP2020 45 mm-diameter photomultiplier. Some typical photomultiplier characteristics - such as gain, dark current, transit and rise times - are compared with data provided by the manufacturer. Photomultiplier characteristics generally not available from the manufacturer, such as the single photoelectron time spread for the full photocathode illumination, the relative coliction efficiency as a function of the voltage between photocathode and focusing electrode, were measured and are discussed, particularly with respect to the optimization of photomultiplier operating conditions for timing applications. Measurements were also made on the photomultiplier's high repetition rate counting performance as well as the rate dependent photomultiplier gain. (ERA citation 06:004083)

LBL-11028 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Performance Studies of High Gain Photomultiplier Having Z-Configuration of Microchannel Plates.
C. C. Lo, and B. Leskovar. Nov 80, 10p CONF-801103-11
Contract W-7405-ENG-48
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

The characteristics of a high gain type ITT F4129 photomultiplier having three microchannel plates in cascade for electron multiplication have been investigated. These plates are in the Z-configuration. Measurements are given of the gain, dark current, cathode quantum efficiency, anode pulse linearity, electron transit time, single and multiphoton time spreads, fatigue, and pulse height resolution. The gain as a function of transverse magnetic field has been measured and is discussed. Photomultiplier characteristics as a function of the input pulse repetition frequency have also been investigated and discussed. (ERA citation 06:004084)

18E. Nuclear Power Plants

CONF-8010103-6 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
LOFT: A Nuclear Plant Providing Realistic Answers to PWR Licensing Issues.
C. W. Solbrig. 1980, 3p
Contract AC07-76ID01570
LOFT/utility technology transfer meeting, Idaho Falls, ID, USA, 16 Oct 1980.

The following topics are discussed: the LOFT mission; LOFT results which have been used by NRC's office of Nuclear Reactor Regulation (NRR); NRR current LOFT information needs; and the channels of LOFT results dissemination. (ERA citation 06:003702)

NUREG/CR-1821 PC **A08**/MF **A01**
Lawrence Livermore National Lab., CA.
Seismic Review of the Robert E. Ginna Nuclear Power Plant as Part of the Systematic Evaluation Program.
Technical rept.,
R. C. Murray, T. A. Nelson, D. S. Ng, C. Y. Liaw, and J. D. Stevenson. Dec 80, 157p UCRL-53014

A limited seismic reassessment of the Robert E. Ginna Nuclear Power Plant was performed by the Lawrence Livermore National Laboratory (LLNL) for the U.S. Nuclear Regulatory Commission (NRC) as part of the Systematic Evaluation Program. The reassessment focused generally on the reactor coolant pressure boundary and on those systems and components necessary to shut down the reactor safely and to maintain it in a safe shutdown condition following a postulated earthquake characterized by a peak horizontal ground acceleration of 0.2 g. Unlike a comprehensive design analysis, the reassessment was limited to structures and components deemed representative of generic classes. Conclusions and recommendations about the ability to selected structures and equipment to withstand the postulated earthquake are presented.

NUREG-0540-V-2-10 PC **A21**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Title List of Documents Made Publicly Available, October 1-31, 1980. Volume 2, Number 10.
Monthly rept.
Jan 81, 480p
See also Volume 2, Number 9, NUREG-0540-V-2-9.

This document is a monthly publication containing descriptions of information received and generated by the US NRC. This information includes (1) docketed material associated with civilian nuclear power plants and other uses of radioactive materials and (2) nondocketed material received and generated by NRC pertinent to its role as a regulatory agency. The docketed information includes information formerly issued through the U.S. Department of Energy's Technical Information Center under the title Power Reactor Docket Information (PRDI). This document replaces PRDI, which will no longer be prepared. This document contains the following indexes: Personal Author Index, Corporate Source Index, and Report Number Index.

NUREG-0746 PC **A03**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Office of Inspection and Enforcement.
Emergency Preparedness Evaluation for TMI-1. Metropolitan Edison Company, et al., Three Mile Island Nuclear Station Unit 1, Docket 50-289.
Technical rept.
Dec 80, 38p

The Metropolitan Edison Company filed with the Nuclear Regulatory Commission, the Three Mile Island Nuclear Station Unit-1 Emergency Plan, Revision 2, dated June 10, 1980. Based on our review, we conclude that the Three Mile Island Unit 1 Emergency Plan meets the requirements of 10 CFR 50 Appendix E, the standards of 10 CFR 50.47b and conforms to the guidance found in NUREG-0654, Revision 1, (November 1980) except for those items requiring further resolution as identified in the report. The items and the required corrective actions are detailed in the body of the report and are summarized in the Conclusions section. The licensee must also conduct a joint exercise with the State and county governments to show that the Plan can be implemented. A subsequent finding on the state of preparedness in the environs around the site will be furnished by the Federal Emergency Management Agency.

PB81-139503
(Order as PB81-139479, PC **A04**/MF **A01**)
Office of Naval Research, London (England).
Three-Mile Island and Other Energy Concerns.
J. R. Neighbours. 30 Jun 80, 3p
Included in European Scientific Notes, v34 n6 p272-274, 30 Jun 80.

Other energy topics considered include tidal power, wave power, pumped storage, and flywheel energy storage.

PB81-856502 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Nuclear Power Plants and Nuclear Power Generation. January, 1970-December, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Dec 80.
Dec 80, 109p NERACUSGNT2681
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and evaluation of nuclear power plants and nuclear power generation. Comparisons with other types of power generation are included along with economic assessments of nuclear power technology and various aspects of general and specific nuclear power plant constructions and operations. (Contains 83 citations, fully indexed and including a table of contents.)

PB81-856510 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Economic Analysis of Nuclear Power Plants and Nuclear Power Generation. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Dec 80, 73p NERACEDBNT2681
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning economic analysis and evaluation of nuclear power plants and nuclear power generation. Comparisons with other types of power generation are included along with economic assessments of nuclear power technology and various aspects of general and specific nuclear power plant constructions and operations. (Contains 60 citations, fully indexed and including a table of contents.)

18F. Radiation Shielding and Protection

CONF-801107-32 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
TMI-2 Criticality Analysis: Parametric Studies and Overall Results.
R. M. Westfall, J. T. West, G. E. Whitesides, and J. T. Thomas. 1980, 7p
Contract W-7405-ENG-26
ANS international conference, Washington, DC, USA, 17 Nov 1980.

Three hypothetical disrupted core models were analyzed for the President's Commission on the Accident at Three Mile Island Unit 2. The purpose of this paper is to provide a summary of the results obtained from preliminary parametric studies and from the analyses of the disrupted core models. Hopefully, the implications from these results are useful in planning plant recovery operations. However, the scope of this study did not include a

quantitative determination of the probable condition of the reactor core or, on the other end, the development of recommendations for specific actions to assure the criticality safety of the plant. (ERA citation 06:003707)

CONF-801111-21 PC **A02**/MF **A01**
Tennessee Univ., Knoxville.
Convoy Electron Production in Polycrystalline and Monocrystalline Targets.
S. Huldt. 1980, 4p
Contract W-7405-ENG-26
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980.

The velocity distribution of electrons ejected close to the forward direction by 0.8-2 MeV/A ions traversing various solid targets, including a Au monocrystal, is measured in coincidence with emerging charge-selected ions. The velocity spectrum is observed to be independent of outgoing projectile velocity and charge state for polycrystalline targets. Measurements on the Au crystal under channeling conditions show dependences on final charge state, and are tentatively explained by assuming that the main contribution to the production yield comes from the non-channeled fraction of the ions. A simple model for the creation of the forward-ejected electrons is proposed, which accounts for most of the experimental findings. (ERA citation 06:004348)

CONF-801134-9(Dr) PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Neutron Scattering Experiments on the Magnetism in Cu-MN Single Crystals.
S. A. Werner, and J. W. Cable. Oct 80, 13p
Contract W-7405-ENG-26
26. annual conference on magnetism and magnetic metals, Dallas, TX, USA, 11 Nov 1980.

Neutron polarization analysis experiments, and unpolarized neutron scattering experiments, were made on annealed single crystal Cu-Mn samples of 5, 10, 15, and 25 at. % Mn. Peaks in the magnetic diffuse scattering are found at the (1, 1/2 +- delta, 0)-type positions in reciprocal space, where delta = 0.34, 0.29, 0.25 and 0.19 for the 5, 10, 15 and 25% Mn samples respectively. This magnetic scattering is symmetry-related to the diffuse nuclear scattering centered at the (1, 1/2, 0)-type positions arising from atomic short range order. The intensity of this diffuse magnetic scattering in all of the alloys decreases smoothly with temperature, approaching zero in the range 300 to 350 exp 0 K. The spin-spin correlation range, as judged from the width of the magnetic diffuse peaks, also decreases smoothly with temperature. Neither the width nor the intensity of this magnetic scattering gives any hint of a freezing transition at lower temperatures. (ERA citation 06:004349)

DOE/ER/03342-8 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
Low Temperature and Neutron Physics Studies. Progress Report, May 1979-May 1980.
May 80, 7p
Contract AS02-76ER3342

Experimental research work with the neutron diffraction spectrometers at the MIT Research Reactor has concentrated during the past year on (a) dynamical diffraction effects in perfect crystals, (b) exploitation of a neutron interferometer system in studying various fundamental physics problems and (c) studies of the Fresnel diffraction patterns produced by simple slit systems. It has been found that neutrons in the process of being diffracted in an extended crystal travel with an anomalous drift velocity smaller than the normal group velocity. Moreover the transmission of these drift neutrons through the crystal has been established as being anomalously high analogously to the anomalous Borrman transmission of x-rays. A two-crystal interferometer system has been used to search for the existence of a Shimony phase effect that would arise from the presence of additional nonlinear energy terms in the Schrodinger equation. No phase effects were found and an upper limit of 3 x 10- exp 13 eV has been set for the magnitude of such terms. The interferometer has also been used to search for a possible coupling of the neutron magnetic structure with a vector magnetic potential and again no phase effect was measurable. Preliminary experiments on the effect of interferometer rotation while the neutrons are in transit have shown that the normal effects caused by terrestrial rotation can be modified or suppressed. Additional research has been carried out at Institut Laue-Langevin (Grenoble) in which single (and multiple) slit Fresnel diffraction patterns are being studied in a search for nonlinear optical effects. (ERA citation 06:004353)

ITEF-83(1978) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Proposal of Experiment for Investigation of the Neutron Spin Flip Due to Coherent Parity Violation.
Yu. G. Abov, A. D. Gul'ko, M. M. Danilov, O. N. Ermakov, and I. L. Karpikhin. 1978, 37p
In Russian.
U.S. Sales Only.

An experiment is proposed to measure the neutron spin flip due to coherent parity violation in polarized neutron passing through specimens of bismuth, lead and beryllium. It is proposed to measure the projection of the polarization of a cold neutron beam on the axis perpendicular to the direction of initial polarization. To offset the facility "self-helicity" caused by deviation of the inlet and outlet magnetic fields in the specimen from being perpendicular and the neutron spin flip in the specimen magnetic field is the major obstacle. The sources of possible systematic errors and the apparatus asymmetry due to stochastic fluctuations are analyzed. The evaluated sensitivity of the facility is about 10 exp -6 rad. (Atomindex citation 11:524187)

JINR-R-14-12653 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics.
Spectral Dependence of Angular Distribution Halfwidths of Vavilov-Cherenkov Radiation.
A. P. Kobzev, and I. M. Frank. 1979, 11p
In Russian.
U.S. Sales Only.

Angular distributions of Vavilov-Cherenkov radiation have been measured. This radiaiton is excited during 210 keV electron propagation in a 2.5 mm thick mica target in a spectral range from 2500 up to 5000 A. A formula for diffraction halfwidth of angular distribution has been derived, its applicability limits are pointed out. Experimental halfwidth agrees with the calculated ons. The deviation of angular distribution maximum from Vavilov-Cherenkov radiation angle is analyzed. This deviation is due to radiator boundaries and multiple scattering of electrons. (Atomindex citation 11:524208)

NUREG-0383-V-1-REV-3 PC **A16**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Fuel Cycle and Material Safety.
Directory of Certificates of Compliance for Radioactive Materials Packages; Summary Report of NRC Approved Packages.
Dec 80, 357p
See also Volume 1, revision 2, NUREG-0383-V-1-REV-2.

This directory contains a Summary Report of NRC approved Packages (Volume 1), Certificates of Compliance (Volume 2), and a Summary Report of NRC Approved Quality Assurance Programs for Radioactive Material Packages (Volume 3). The purpose of this directory is to make available a convenient source of information on packagings which have been approved by the U.S. Nuclear Regulatory Commission. To assist in identifying packaging, and index by Model Number and corresponding Certificate of Compliance number is included at the back of each volume of the directory. The Summary Report includes a listing of all users of each package design prior to the publication date of the directory. Shipments of radioactive material using these packagings must be in accordance with the provisions of 49 CFR 173.393a and 10 CFR Part 71, as applicable. In satisfying the requirements of Section 71.12, it is the responsibility of the licensees to insure them--that they have a copy of the current approval and conduct their transportation activities in accordance with an NRC approved quality assurance program.

18G. Radioactive Wastes and Fission Products

CONF-801103-13 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Electronics System for Transuranic Waste Assays.
R. S. Lawrence, L. O. Johnson, F. Y. Tsang, E. B. Nieschmidt, and S. H. Vegors, Jr. 1980, 5p
Contract AC07-76ID01570
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

A slagging pyrolysis incinerator has been proposed to reduce the volume of stored transuranic (TRU) waste material. This report describes the electronics developed for a fast TRU waste assay system using photon interrogation. The system uses a pulsed electron beam from a linear accelerator to produce a high-energy photon burst, termed the gamma flash, from a metallic converter. The photons induce fission in the TRU. A high-rate counting system is used to relate the production rate of photon induced neutrons to the amount of fissile material present in the waste. (ERA citation 06:003523)

CONF-801107-40 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Radioactive Waste Management Centers: An Approach.
A. L. Lotts. 1980, 40p
Contract W-7405-ENG-26
ANS international conference, Washington, DC, USA, 17 Nov 1980.

Radioactive waste management centers would satisfy the need for a cost-effective, sound management system for nuclear wastes by the industry and would provide a well integrated solution which could be understood by the public. The future demands for nuclear waste processing and disposal by industry and institutions outside the United States Government are such that a number of such facilities are required between now and the year 2000. Waste management centers can be organized around two general needs in the commercial sector: (1) the need for management of low-level waste generated by nuclear power plants, the once-through nuclear fuel cycle production facilities, from hospitals, and other institutions; and (2) more comprehensive centers handling all categories of nuclear wastes that would be generated by a nuclear fuel recycle industry. The basic technology for radioactive waste management will be available by the time such facilities can be deployed. This paper discusses the technical, economic, and social aspects of organizing radioactive waste managment centers and presents a strategy for stimulating their development. (ERA citation 06:004566)

DOE/EDP-0064 PC **A07**/MF **A01**
Department of Energy, Washington, DC.
Environmental Development Plan: Defense Waste Management.
Sep 80, 147p

This Environmental Development Plan (EDP) encompasses the programmatic and environmental, health and safety considerations associated with the handling of DOE wastes generated primarily as a byproduct of the DOE national defense programs. The Defense Waste Management Program and the Commercial Waste Manageent (CWM) Program deal with similar technologies pertaining to waste processing, immobilization, packaging, burial, and disposal. However, commercial waste activities are addressed in a separate EDP and are considered in this EDP to the extent that such activities are common to the Defense Waste Management Program. This plan does not address mining and milling tails, transportation of wastes, decommissioning and decontamination (D and D) programs or safeguards, security, and profliferation aspects. (ERA citation 06:003525)

DOE/OR/20769-T1 PC **A10**/MF **A01**
Politech Corp., Washington, DC.
New Jersey State Information Handbook: Formerly Utilized Sites Remedial Action Program.
31 Oct 80, 212p
Contract AC05-800R20769

Under the implied authority of the Atomic Energy Act of 1954, as amended, radiological surveys and research work has been conducted to determine radiological conditions at former MED/AEC sites. As of this time, 31 sites in 13 states have been identified that require or may require remedial action. This volume is one of a series produced under contract with DOE, Office of Nuclear Waste Management, by POLITECH CORPORATION to develop a legislative and regulatory data base to assist the FUSRAP management in addressing the institutional and socioeconomic issues involved in carrying out the Remedial Action Program. This Information Handbook series contains information about all relevant government agencies at the Federal and state levels, the pertinent programs they administer, each affected state legislature, and current Federal and state legislative and regulatory initiatives. This volume is a compilation of information about the state of New Jersey. It contains: a description of the state executive branch structure; a summary of relevant state statutes and regulations; a description of the structure of the state legislature, identification of the officers and committee chairmen, and a summary of recent relevant legislative action; and the full text of relevant statutes and regulations. The loose-leaf format used in these volumes will allow the material to be updated periodically as the Remedial Action Program progresses. (ERA citation 06:003564)

PNL-SA-8975 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Natural Analogues for Crystalline Radioactive Waste Forms. Part II. Non-Actinide Phases.
R. F. Haaker, and R. C. Ewing. Oct 80, 9p
CONF-801124-26
Contract AC06-76RL01830
Annual meeting of the Materials Research Society, Boston, MA, USA, 17 Nov 1980.

The purpose of this paper is to summarize relevant geologic literature on mineral analogues to important non-actinide phases in synroc and supercalcine. Solid solution chemistry, occurrence, and alteration effects are emphasized. Stable and unstable mineral associations are identified. The report also summarizes the behavior of mineral analogues to the actinide phases in synroc and supercalcine. (ERA citation 06:005111)

PNL-3473 PC **A04**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Waste/Rock Interactions Technology Program. Status Report on LWR Spent-Fuel Leach Tests.
Y. B. Katayama, D. J. Bradley, and C. O. Harvey. Nov 80, 51p
Contract AC06-76RL01830

Spent fuels with burnups of 9000, 28,000 and 54,500 MWd/MTU have been leach tested at 25 exp 0 C. Three leach-test procedures (Paige, IAEA and static) were used. IAEA and static tests were conducted in five different solutions: deionized water, sodium bicarbonate, sodium chloride, calcium chloride and Waste Isolation Pilot Plant B brine solutions. Elemental leach data are reported based on the release of exp 90 Sr exp +90 Y, exp 106 Ru, exp 137 Cs, exp 144 Ce, exp 154 Eu, exp 239+240 Pu, exp 125 Sb, exp 244 Cm, exp 129 I, exp 99 Tc, and total uranium. This is the first report on exp 129 I and exp 99 Tc from spent fuel. Termination of the Paige test showed that the plateout (radionuclide adsorption) on the test apparatus had negligible effect on the leach rate of cesium and plutonium, but a major (up to a factor of 50 times) effect on the curium leach rate. Three-hundred additional days of leach testing by the IAEA procedure, from 467 to 769 d, showed a continuation of the leaching trends observed during the first 467 d. Results from the first two static leach test series, 2 and 8 d, gave the exp 129 I and exp 99 Tc release numbers. (ERA citation 06:004596)

PNL-3564 PC **A02**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Issues and Scenarios for Nuclear Waste Management Systems Analysis.
J. E. Mendel. Nov 80, 18p
Contract AC06-76RL01830

The Planning and Analysis Branch of the Department of Energy's Nuclear Waste Management Programs is developing a new systems integration program. The Pacific Northwest Laboratory was requested to perform a brief scoping analysis of what scenarios, questions, and issues should be addressed by the systems integration program. This document reports on that scoping analysis. (ERA citation 06:004583)

RHO-BWI-LD-24 PC **A03**/MF **A01**
Atomics International Div., Richland, WA. Rockwell Hanford Operations.
Identification of Candidate Sites Suitable for a Geologic Repository in Basalt within Hanford.
Feb 80, 50p
Contract AC06-77RL01030

The Basalt Waste Isolation Project (BWIP), under contract with the US Department of Energy, is charged with examining the feasibility of disposing of nuclear waste in a deep repository in basalt beneath the Hanford Site. One of the major tasks of the BWIP consists of identifying a site within Hanford which may be suitable for a nuclear waste repository. The site identification effort started in 1978 with geologic and hydrologic reconnaissance studies. The work will be completed with identification and characterization of the site considered suitable for a repository. The Detailed Site Characterization Report will provide a detailed description of site conditions and describe how the site satisfies the US Nuclear Regulatory Commission criteria for nuclear waste repositories. The site identification process to date has involved the following steps: development of guidelines and decision theory; assemblage and cataloging of existing data; screening of the data using a structured process; identification of site localities; and identification of an initial seven candidate sites. The first four steps are reported elsewhere. Step 5 is the subject of this report. Guidelines for screening were developed based on an analysis of existing and proposed regulations. The guidelines were designed to be sufficiently restrictive to provide a sorting mechanism. Seven contiguous candidate sites have been identified within the Hanford Site. Collectively, these sites encompass a 70-square-mile portion of the Cold Creek syncline. The candidate sites within the Cold Creek syncline satisfy the BWIP screening considerations. The critical criteria in the selection were the geologic and hydrologic considerations. Information gathered to date has not shown any major impediment to siting a geologic repository within the Cold Creek syncline. (ERA citation 06:004588)

SAND-80-2463C PC **A02**/MF **A01**
Sandia National Labs., Albuquerque, NM.
Fluid Migration Studies in Salt.
H. C. Shefelbine, and G. E. Raines. 1980, 8p
CONF-801209-3
Contract AC04-76DP00789
Annual National Waste Terminal Storage (NWTS) information meeting, Columbus, OH, USA, 9 Dec 1980.

This discussion will be limited to the migration of water trapped in the rock salt under the influence of the heat field produced by nuclear waste. This is of concern because hypothetic! scenarios have been advanced in which this fluid movement allows radionuclides to escape to the biosphere. While portions of these scenarios are supported by observation, none of the complete scenarios has been demonstrated. The objectives of the present fluid migration studies are two-fold: 1. determine the character of the trapped fluid in terms of quantity, habitat and chemical constituents; and 2. define the mechanisms that cause the fluid to migrate toward heat sources. Based on the observations to date, fluid migration will not have a major impact on repository integrity. However, the above objectives will be pursued until the impacts, if any, can be quantified. (ERA citation 06:004592)

UCID-18796-80-2 PC **A04**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Waste Isolation Program Evaluation Assistance. Second Quarterly Technical Progress Report.
R. C. Maninger, and T. F. Harvey. 21 Nov 80, 53p
Contract W-7405-ENG-48

This report covers the effort for the second quarter on the Waste Isolation Program Evaluation Assistance Project at LLNL. During this period, previously prepared MDB charts were revised to incorporate comments received from the ONWI Planning Staff. Some improvements were also made in the graphical elements and syntax to improve the information content of the charts. The concept and use of adjacency matrices were also introduced to aid in the preparation of MBD description of plans. (ERA citation 06:004593)

UCRL-15210 PC **A05**/MF **A01**
Camp, Dresser and McKee, Inc., Champaign, IL. Water Resources Div.
Comparison of One-, Two-, and Three-Dimensional Models for Mass Transport of Radionuclides.
T. A. Prickett, M. L. Voorhees, and B. L. Herzog. Feb 80, 95p
Contract W-7405-ENG-48

This technical memorandum compares one-, two-, and three-dimensional models for studying regional mass transport of radionuclides in groundwater associated with deep repository disposal of high-level radioactive wastes. In addition, this report outlines the general conditions for which a one- or two-dimensional model could be used as an alternate to a three-dimensional model analysis. The investigation includes a review of analytical and numerical models in addition to consideration of such conditions as rock and fluid heterogeneity, anisotropy, boundary and initial conditions, and various geometric shapes of repository sources and sinks. Based upon current hydrologic practice, each review is taken separately and discussed to the extent that the researcher can match his problem conditions with the minimum number of model dimensions necessary for an accurate solution. (ERA citation 06:003539)

18H. Radioactivity

AD-A094 223/5 PC **A03**/MF **A01**
Advanced Research and Applications Corp., Sunnyvale, CA.
Scoping the Impact of Nuclear Bursts at Sea on the Environment.
Final rept. 1 Aug 78-20 Apr 79,
H. Lee. 20 Apr 79, 35p DNA-4936F
Contract DNA001-78-C-0377

This report provides a scoping analysis on phenomena and effects of nuclear detonations at sea. It provides, with the use of example calculations, estimates of the short- and long-term radiological impacts on the ocean environment. The example calculated results showed that the radiation rates in the sea at early times, out to distances beyond severe vessel damage, are sufficiently high to warrant concern; however, because of radioactive decay and diffusive expansion, the radioactivity is reduced to negligible hazard levels within about one to two days. (Author)

BNL-28350 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Radiation Damage Studies on Natural and Synthetic Rock Salt.
P. W. Levy, and K. J. Swyler. 1980, 25p CONF-8005107-2
Contract AC02-76CH00016
Alternate waste form information workshop, Gatlinburg, TN, USA, 13 May 1980.

Radiation damage studies are being made on natural rock salt from various localities, including potential repository sites and on synthetic melt-grown crystals. Sufficient information will be obtained to compute the radiation damage in repository salt at any point as a function of time, temperature, canister temperature and radiation levels, strain in the rock, salt, backfill materials, and other parameters. Most of the completed measurements have been made with unique equipment at BNL for making optical and other measurements on samples before, during, and after irradiation with 1- to 3-MeV electrons. Samples are irradiated in temperature-controlled chambers containing an inert exchange gas. Radiation damages on natural rock salts and synthetic melt-grown crystals, characterized by determining the radiation-induced F-

center, colloid, and V-region absorption, are described in detail. (ERA citation 06:003521)

EGG-PHYS-5272 PC **A04**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Fast Neutron Spectroscopy by Gas Proton-Recoil Methods at the Light Water Reactor Pressure Vessel Simulator.
J. W. Rogers. Oct 80, 52p
Contract AC07-76ID01570

Fast neutron spectrum measurements were made in a Light Water Reactor (LWR) Pressure Vessel Simulator (PVS) to provide neutron spectral definition required to appropriately perform and interpret neutron dosimetry measurements related to fast neutron damage in LWR-PV steels. Proton-recoil proportional counter methods using hydrogen and methane gas-filled detectors were applied to obtain the proton spectra from which the neutron spectra were derived. Cylindrical and spherical geometry detectors were used to cover the neutron energy range between 50 keV and 2 MeV. Results show that the neutron spectra shift in energy distribution toward lower energy between the front and back of a PVS. The relative neutron flux densities increase in this energy range with increasing thickness of the steel. Neutron spectrum fine structure shapes and changes are observed. These results should assist in the generation of more accurate effective cross sections and fluences for use in LWR-PV fast neutron dosimetry and materials damage analyses. (ERA citation 06:003697)

ORNL-tr-4695 PC **A03**/MF **A01**
Oak Ridge National Lab., TN.
Investigation of the Behavior of Radionuclides in the Ground.
K. Nishimaki. Oct 78, 29p
Contract W-7405-ENG-26
C a Japanese paper.Thesis.

Research was conducted with the aim of establishing a basis for safety assessments for the disposal of radioactive waste; this research consisted of experimental investigations on the behavior of radionuclides that enter the groundwater when radioactive materials escape into the ground from a radioactive waste disposal facility located at the site of a nuclear power plant. The present report was drawn primarily from the results of field tests comprising one segment of this research. Actual field tests were conducted at the proposed land storage site for a nuclear power plant in Japan, and the movement of groundwater examined, on the basis of which the behavior of radionuclides in the ground was derived. To study the behavior of water, a group of observation wells were located in a concentric arrangement, sample water to which NaBr had been added as a tracer (hereafter shortened to test water) poured (into the ground) at the center point, and the Br concentration in the groundwater subsequently collected from the observation wells measured. In the laboratory the distribution coefficients of radioactive cations (exp 60 Co and exp 85 Sr) to the sand, which governs the movement of radioactive cations, were obtained experimentally with imitated groundwater. Finally, based on the results of ground water movement obtained in the field tests and the radionuclide distribution coefficients obtained from the laboratory experiments, conjectures are drawn regarding the pattern of radionuclide migration through the ground when water containing those radionuclides permeates from a given point in A block. (ERA citation 06:005297)

PB81-142770 Not available NTIS
National Bureau of Standards, Washington, DC.
Modeling of Radon and Daughter Concentrations in Ventilated Spaces,
T. Kusuda, S. Silberstein, and P. E. McNall, Jr.
Nov 80, 7p
Pub. in Jnl. of Air Pollution Control Association 30, n11 p1201-1207 Nov 80.

In order to predict indoor radiation levels due to radon daughters at low building ventilation and air leakage rates, differential equations governing the decay and venting of radon Rn-222 and its daughters were solved. A computer program based on the solutions was written to predict radon and daughter concentrations, total potential alpha energy and equilibrium factor. The program can account for time dependence of ventilation and emanation rates and is readily usable by building designers. Sample calculations using the program showed that tightened buildings can commonly have potential alpha energy levels near 0.01 working level (WL), a level more than twice as high as concentrations currently found in most houses.

18I. Reactor Engineering and Operation

CONF-8010103-4 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
Semiscle Program.
P. North. 1980, 16p
Contract AC07-76ID01570
LOFT/utility technology transfer meeting, Idaho Falls, ID, USA, 16 Oct 1980.

The major objective o. the Semiscale Program is to gather system thermal-hydraulic behavior data that is germane to reactor safety questions and/or to the conduct of experiments in the Loss-of-Fluid Test (LOFT) Facility. The relationship between Semiscale experiment results and questions of reactor safety exists primarily through computer codes designed to calculate thermal-hydraulic behavior. The Semiscale experiment results are used to test the computer codes and to provide a basis for improvement where deficiencies are found. The improved analysis codes are then applied to LOFT experiment analysis or to reactor safety analysis. The experiment facility is a 1:1500 power and volume scaled system that represents the major features of a conventional pressurized water reactor. The vertical dimensions are retained at full scale so cross-sectional areas are reduced. The system has a 25-rod electrically heated core simulator and the fact that the system is small and non-nuclear allows relatively rapid and economic experiments. (ERA citation 06:003709)

CONF-8010103-5 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
LOFT Small Break Experiments: Importance and Effectiveness of Steam Generators and Natural Circulation.
J. H. Linebarger. 1980, 14p
Contract AC07-76ID01570
LOFT/utility technology transfer meeting, Idaho Falls, ID, USA, 16 Oct 1980.

Both four and one inch break diameters in a commercial pressurized water reactor (PWR) have been simulated in LOFT small break experiments. LOFT Experiments (LOCAs) L3-1 and L3-7, respectively, are examples. During L3-1 the fluid leaving the break removed sufficient energy to depressurize the system while the core remained covered with fluid. The U-tube steam generator was not needed to recover the system. In L3-7, a simulated one inch diameter break, the steam generator was required and was effective in both removing energy to depressurize the system and providing the operator a means of controlling the primary system depressurization rate. (ERA citation 06:003710)

CONF-801091-5 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Multidimensional Effects in the Thermal Response of Fuel Rod Simulators.
R. D. Dabbs, and L. J. Ott. 1980, 15p
Contract W-7405-ENG-26
International symposium on fuel rod simulators-development and application, Gatlinburg, TN, USA, 22 Oct 1980.

One of the primary objectives of the Oak Ridge National Laboratory Pressurized-Water Reactor Blowdown Heat Transfer Separate-Effects Program is the determination of the transient surface temperature and surface heat flux of fuel pin simulators (FPSs) from internal thermocouple signals obtained during a loss-of-coolant experiment (LOCE) in the Thermal-Hydraulics Test Facility. This analysis requires the solution of the classical inverse heat conduction problem. The assumptions that allow the governing differential equation to be reduced to one dimension can introduce significant errors in the computed surface heat flux and surface temperature. The degree to which these computed variables are perturbed is addressed and quantified. (ERA citation 06:003704)

CONF-801091-7 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Need and Procedure for Calibration of Fuel Rod Simulators.
R. D. Dabbs, and L. J. Ott. 1980, 22p
Contract W-7405-ENG-26
International symposium on fuel rod simulators-development and application, Gatlinburg, TN, USA, 22 Oct 1980, Portions of document are illegible.

An experimental thermocouple calibration procedure and four-part calibration program, ORTCAL (ORNL Thermocouple Calibration), have been developed to supply FRS performance information to the inverse heat conduction model and program ORINC. Case studies have shown that failure to fully classify FRSs with regard to component physical properties, gaps, etc., can result in severe errors during inverse calculations of the driving potential at the surface of the FRS (delta T), the spatial and temporal history of the heat flow within the FRS, and the surface heat flux. (ERA citation 06:003705)

CONF-801091-9 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Limits on the Experimental Simulation of Nuclear Fuel Rod Response.
R. C. Hagar. 1980, 16p
Contract W-7405-ENG-26
International symposium on fuel rod simulators-development and application, Gatlinburg, TN, USA, 22 Oct 1980.

The steady-state and transient effects of intrinxic geometric and material property differences between typical nuclear fuel pins and electric fuel pin simulators (FPSs) are identified. The effectiveness of varying the transient power supplied to the FPS in reducing the differences between the transient responses of nuclear fuel pins and FPSs is investigated. This effectiveness is shown to be limited by the heat capacity of the FPS, the allowed range of the power program, and different FPS power requirements at different positions on a full-length FPS. (ERA citation 06:003706)

CONF-801103-9 PC **A02**/MF **A01**
EG and G Idaho, Inc., Idaho Falls.
LOFT Advanced Control Room Operator Diagnostic and Display System (ODDS).
D. G. Larsen, and T. C. Robb. 1980, 10p
Contract AC07-76ID01570
IEEE nuclear science symposium, Orlando, FL, USA, 5 Nov 1980.

The Loss-of-Fluid Test (LOFT) Reactor Facility in Idaho includes a highly instrumented nuclear reactor operated by the Department of Energy for the purpose of establishing nuclear safety requirements. The results of the development and installation into LOFT of an Operator Diagnostic and Display System (ODDS) are presented. The ODDS is a computer-based graphics display system centered around a PRIME 550 computer with several RAMTEK color graphic display units located within the control room and available to the reactor operators. Use of computer-based color graphics to aid the reactor operator is discussed. A detailed hardware description of the LOFT data system and the ODDS is presented. Methods and problems of backfitting the ODDS equipment into the LOFT plant are discussed. (ERA citation 06:003699)

CONF-801107-31 PC **A02**/MF **A01**
Tennessee Univ., Knoxville. Dept. of Nuclear Engineering.
Analysis of Relationship Between Stability and Flow Parameters in a BWR.
B. R. Upadhyaya, and M. Kitamura. 1980, 6p
Contract W-7405-ENG-26
ANS international conference, Washington, DC, USA, 17 Nov 1980.

Results of quantitative analysis of mutual relationship between the BWR stability and channel steam velocity are presented. The stability parameter, defined by the damping ratio, and the steam velocity are estimated by analysis of neutron noise data from local power range monitor (LPRM) detector

signals. These parameters are treated as varying randomly as a function of time. (ERA citation 06:003676)

CONF-801107-34 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Application of Differential Sensitivity Theory to Transients with Scram.
C. V. Parks, P. J. Maudlin, and C. F. Weber.
1980, 9p
Contract W-7405-ENG-26
ANS international conference, Washington, DC, USA, 17 Nov 1980.

Differential sensitivity theory (DST) based on adjoint functions has been applied to various reactor safety problems. The most comprehensive application of DST sensitivity analysis has addressed the coupled thermal-hydraulic equations of the MELT-III fast reactor safety code, where a power ramp was imposed to eliminate the neutron point kinetics equations. In extending the above work to include realistic neutronic coupling, a DST procedure was developed for dealing with parameter discontinuities induced by dependent variables. (ERA citation 06:003708)

DOE/SF/02034-T7 PC **A12**/MF **A01**
Gas-Cooled Reactor Associates, La Jolla, CA.
Utility Assessment: The Market for the High Temperature Gas-Cooled Reactor and the Incentives for Its Utilization.
Sep 80, 251p
Contract AC03-78SF02034

The approach taken in this assessment is one in which the HTGR is evaluated from the perspective of its eventual users and operators - the utility industry. Section 2 of this report presents projections of future electrical and process heat energy demands in order to attempt to quantify the potential market for the HTGR. Section 3 provides an analysis of the effects of the HTGR on specific utility systems as well as extrapolated results on a national basis. Section 4 presents assessments of the various recognized incentives for HTGR commercialization. Sections 5, 6, and 7 present technical descriptions, and economic and market assessments of each of the three reference HTGR systems, namely the HTGR Steam Cycle, Gas Turbine, and Reformer. (ERA citation 06:003682)

GA-A-15838 PC **A06**/MF **A01**
General Atomic Co., San Diego, CA.
STEFINS: A Steel Freezing Integral Simulation Program.
M. V. Frank. Sep 80, 121p
Contract AT03-76SF71023

STEFINS (STEel Freezing INtegral Simulation) is a computer program for the calculation of the rate of solidification of molten steel on solid steel. Such computations arize when investigating core melt accidents in fast reactors. In principle this problem involves a coupled two-dimensional thermal and hydraulic approach. However, by physically reasonable assumptions a decoupled approach has been developed. The transient solidification of molten steel on a cold wall is solved in the direction normal to the molten steel flow and independent from the solution for the molten steel temperature and Nusselt number along the direction of flow. The solutions to the applicable energy equations have been programmed in cylindrical and slab geometries. Internal gamma heating of steel is included. (ERA citation 06:003712)

GA-A-16015 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Gas Flow and Thermal Mixing in a Helically Wound Tube Bundle.
H. D. Chiger. Jul 80, 95p
Contract AT03-76ET35300

The thermal dissipation of a hot gas streak flowing across a segment of a helically wound tube bundle and the bypass flow streaming between the tubes and the bundle wall were investigated experimentally in the range of 8000 < Re < 50,000. Two different modes of creating a hot streak were employed. A planar hot streak was (1) injected at the entrance to the tube bundle and (2) generated by electrically heating several tubes past the bundle inlet. In the first case the mixing occurs in a region of lower turbulence since it occurs near the bundle inlet. In the second case the mixing occurs in a region of higher turbulence since the flow has already passed over several tube rows before the hot streak is generated. (ERA citation 06:003698)

HEDL-6835 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Office of Nuclear Waste Isolation. Quarterly Report, April-June 1980.
1980, 13p
Contract AC14-76FF02170

Progress is reported on spent fuel characterization equipment, spent fuel characterization, and spent fuel/package performance. Fuel assembly D04 was determined to have a decay heat value of 1580 watts. Destructive and nondestructive tests are underway on spent fuel rods. Model analysis showed fuel assembly fundamental frequency responses in the 1 to 2 Hz range under pinned end conditions. Nondestructive and destructive post-test examinations were conducted on rods removed from tests 2 and 2b. Differences between calculated and measured decay heats of spent fuel assemblies are discussed. Spent fuel/filler material interaction studies are underway. (ERA citation 06:004563)

NUREG/CR-1211 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Uncertainty in Calculated Surface Temperature and Surface Heat Flux of THTF Heater Rods,
K. W. Childs. Dec 80, 80p ORNL/NUREG/CSD/TM-12
Contract W-7405-eng-26

The report presents a procedure for determining the uncertainty in the output of a complex computer code resulting from uncertainties in its input variables. This method is applied to ORINC (Oak Ridge Inverse Code) to estimate the uncertainty in the calculated surface temperature and surface heat flux of a THTF heater during a blowdown transient. The significant input variables are identified and 95% confidence bands are calculated for the code outputs based on the uncertainty in these input variables.

NUREG/CR-1774 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
High-Temperature Gas-Cooled Reactor Safety Studies for the Division of Reactor Safety Research.
Quarterly progress rept. 1 Apr-30 Jun 80,
S. J. Ball, J. C. Cleveland, J. C. Conklin, and R. M. Harrington. Jan 81, 15p ORNL/NUREG/TM-415
Contract W-7405-eng-26
See also report for Apr-Jun 78, NUREG/CR-0256.

The report covers work performed from April 1 to June 30, 1980. Development of the new steam turbine plant model ORTURB was completed. Further development, implementation, and verification work was done on the BLAST steam generator code.

NUREG/CR-1817 PC **A04**/MF **A01**
Los Alamos Scientific Lab., NM.
Comparison of COMPARE MOD-1 Subcompartment Calculations with Battelle-Frankfurt D-Series Test Results,
J. W. Bolstad, R. G. Gido, W. S. Gregory, P. E. Littleton, and G. J. Willcutt, Jr. Dec 80, 54p LA-8615-MS
Prepared in cooperation with New Mexico State Univ., Las Cruces.

The report describes the results of calculations performed with the COMPARE MOD-1 and COMPARE MOD-2 computer codes. The calculations were performed for six of the Battelle-Frankfurt D-series experiments. The main emphasis of the study is to present a comparison of calculated results and experimental data. The system models used are based on regulatory rather than best-estimate assumptions. The Battelle-Frankfurt D-series tests are described and complete noding information is given for experiments D1, D6, D11, D14, and D15. The main features distinguishing these tests from the others are described. Detailed comparisons between COMPARE MOD-1 calculations and experimental data are given for absolute pressure, differential pressure, and temperature at various points in the system. General trends in the comparisons are noted. Results using a method-of-characteristics approach (COMPARE MOD-2) are presented for experiment D1. These results are compared with both the MOD-1 and experimental data. Summaries of parametric studies performed using COMPARE, as well as studies performed by others, are described for the D-series experiments. Recommendations are given for assessing the conservatism in the calculations.

NUREG/CR-1828 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Eddy-Current Inspection for Steam Generator Tubing Program Quarterly Progress Report for Period Ending March 31, 1980,
C. V. Dodd, W. E. Deeds, and R. W. McClung.
Jan 81, 13p ORNL/NUREG/TM-420
Contract W-7405-eng-26
See also NUREG/CR-1829.

Eddy-current methods provide the best in-service inspection of steam generator tubing, but present techniques can produce ambiguity because of the many independent variables that affect the signals. The current development program has used mathematical models and developed or modified computer programs to design optimum probes, instrumentation, and techniques for multifrequency, multiproperty examination. We are continuing to design and construct instrumentation systems that will be used in the field.

NUREG/CR-1829 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Eddy-Current Inspection for Steam Generator Tubing Program Quarterly Progress Report for Period Ending June 30, 1980,
C. V. Dodd, W. E. Deeds, and R. W. McClung.
Jan 81, 11p ORNL/NUREG/TM-421
Contract W-7405-eng-26
See also NUREG/CR-1563.

Eddy-current methods provide the best in-service inspection of steam generator tubing, but present techniques can produce ambiguity because of the many independent variables that affect the signals. The current development program has used mathematical models and developed or modified computer programs to design optimum probes, instrumentation, and techniques for multifrequency, multiproperty examination. We are continuing to design and construct instrumentation systems that will be used in the field.

NUREG-0304-V-5-2 PC **A08**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Technical Information and Document Control.
Regulatory and Technical Reports Compilation for Second Quarter 1980, April-June. Volume 5, Number 2.
Bibliographical rept. Apr-Jun 80,
Walter E. Oliu, Linda McKenzie, and Ursula Mckinney. Dec 80, 169p
See also Volume 5, Number 1, NUREG-0304-V-5-1.

The compilation lists all NRC Regulatory and Technical reports published under the NUREG series during the second quarter of 1980.

ORNL-5675 PC **A09**/MF **A01**
Oak Ridge National Lab., TN.
Gas-Cooled Fast Reactor Program. Annual Progress Report for Period Ending December 31, 1979.
U. Gat, and P. R. Kasten. Nov 80, 185p
Contract W-7405-ENG-26

Information on the GCFR reactor is presented concerning the Core Flow Test Loop; shielding and physics; pressure vessel and closure studies; and irradiation program. (ERA citation 06:003690)

18J. Reactor Materials

AD-A094 067/6 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.

The NRL-EPRI Research Program (RP886-2), Evaluation and Prediction of Neutron Embrittlement in Reactor Pressure Vessel Materials. Part I. Dynamic C sub v, PCC sub v Investigations.
Annual progress rept. (Final) for CY 1979,
J. R. Hawthorne. 31 Dec 80, 35p Rept no. NRL-MR-4431-PT-1
See also report dated 30 Aug 79, AD-A075 012.

Nuclear reactor pressure vessel materials are subject to progressive reductions in fracture resistance in service due to neutron irradiation. Current technology is inadequate to quantitatively predict radiation embrittlement for all vessel materials and their metallurgical variations for the neutron fluences of interest. In addition a relationship between apparent notch ductility and fracture toughness in the irradiated condition is needed to evolve more quantitative projections of structural integrity. The NRL-EPRI RP886-2 Program was formulated to advance both areas for the benefit of reactor vessel design and operation. Its primary objective is the development of a high-quality data base for evaluation of current radiation-embrittlement projection methods and the development of improved methods. This report documents program highlights and research results for CY 1979 along with plans for the completion of program investigations. Postirradiation test data are presented for plate, forging and weld deposit materials irradiated in six reactor experiments to fluences ranging from approx. 0.1 to approx. 10 to the 19th power n/sq cm > 1 MeV at 288 C. Comparisons are made between results for standard Charpy V-notch and fatigue precracked Charpy-V tests of preirradation and postirradiation metarial conditions. A companion document (Annual Progress Report for CY 1979: Part II) will present results for the 25.4 mm compact toughness (J-R curve) tests of the same materials and material conditions. A preliminary correlation of the Charpy-V and J-integral fracture toughness property changes with irradiation is observed.

CONF-801091-6 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Prevention and Cure of Diseased Fuel Rod Simulators, from Conception to Death, by Timely and Proper Inspection.
S. D. Snyder. 1980, 17p
Contract W-7405-ENG-26
International symposium on fuel rod simulators-development and application, Gatlinburg, TN, USA, 22 Oct 1980.

The major inspection methods - electrical, radiographic, and infrared - employed during the development, fabrication, and use of fuel rod simulators are described. Principal emphasis is placed on the infrared scanning inspection system and interpretation of test results. The role of liquid penetrant inspection and helium mass spectrograph testing is mentioned. Correlation and feed-back of information from all inspections during the development and fabrication steps are detailed. (ERA citation 06:003678)

CONF-801091-8 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Development of Variable Width Ribbon Heating Elements for Liquid Metal and Gas-Cooled Fast Breeder Reactor Fuel Rod Simulators.
R. W. McCulloch, R. T. Lovell, D. W. Post, and S. D. Snyder. 1980, 23p
Contract W-7405-ENG-26
International symposium on fuel rod simulators-development and application, Gatlinburg, TN, USA, 22 Oct 1980.

Variable width ribbon heating elements have been fabricated which provide a chopped cosine, variable heat flux profile for fuel rod simulators used in test loops by the Breeder Reactor Program Thermal Hydraulic Out-of-Reactor Safety test facility and the Gas-Cooled Fast Breeder Reactor Core Flow Test Loop. Thermal, mechanical, and electrical design considerations result in the derivation of an analytical expression for the ribbon contours. From this, the ribbons are machined and wound on numerically controlled equipment. Postprocessing and inspection results in a wound, variable width ribbon with the precise dimensional, electrical, and mechanical properties needed for use in fuel pin simulators. (ERA citation 06:003686)

DOE/DP-0001-6 PC **A03**/MF **A01**
Department of Energy, Washington, DC.
Semi-Annual Report on Strategic Special Nuclear Material Inventory Differences.
Jul 80, 26p

This sixth periodic semiannual report of Inventory Differences (ID) covers the last six months of fiscal year 1979 (April 1, 1979 through September 30, 1979) for the Department of Energy (DOE) and DOE contractor facilities possessing significant quantities of strategic special nuclear material (SSNM). Strategic special nuclear material is plutonium or uranium-233 or uranium-235 in material whose uranium-235 content is 20% or greater (known as highly enriched uranium). A significant quantity is either 2 kilograms of plutonium or uranium-233 or 5 kilograms of uranium-235 in highly enriched uranium or the appropriate weighted combination. (ERA citation 06:003563)

DOE/ET/34213-3 PC **A04**/MF **A01**
Babcock and Wilcox Co., Lynchburg, VA.
Post-Irradiation Examination of Oconee 1 Fuel: End-of-Cycle 2 Nondestructive Test Phase.
Nov 79, 68p BAW-1574
Contract AC02-78ET34213

Standard B and W Mark B (15 x 15) pressurized water reactor fuel assemblies were nondestructively examined at the end of the second cycle of Oconee 1 reactor operation. Burnups of the 16 fuel assemblies examined ranged from 13,100 to 20,000 MWd/mtU. The examinations were conducted in the Oconee 1 and 2 spent fuel storage pool using the installed underwater test equipment. Data obtained included fuel rod and fuel assembly dimensions, water channel spacings, holddown spring forces, fuel rod crud characteristics, and fuel column axial gap and stack lengths. Visual examinations revealed no evidence of significant rod bowing, cladding deformation, cocked grids, or rod defects. The results, summarized in this report, indicate that the assemblies performed well through two cycles of reactor operation. (ERA citation 06:003679)

GA-A-15584 PC **A05**/MF **A01**
General Atomic Co., San Diego, CA.
Gas-Cooled Fast Breeder Reactor Steady-State Irradiation Testing Program.
R. T. Acharya, R. J. Campana, and S. Langer.
Aug 80, 80p
Contract AT03-76SF71023

The requirements for the gas-cooled fast breeder reactor irradiation program are specified, and an irradiation program plan which satisfies these requirements is presented. The irradiation program plan consists of three parts and includes a schedule and a preliminary cost estimate: (1) a steady-state irradiation program, (2) irradiations in support of the design basis transient test program, and (3) irradiations in support of the GRIST-2 safety test program. Data from the liquid metal fast breeder reactor program are considered, and available irradiation facilities are examined. (ERA citation 06:003687)

GA-A-16111 PC **A02**/MF **A01**
General Atomic Co., San Diego, CA.
Processing of FRG Mixed Oxide Fuel Elements at General Atomic under the US/FRG Cooperative Agreement for Spent Fuel Elements.
N. D. Holder, J. B. Strand, F. A. Schwarz, and H. E. Tischer. Nov 80, 17p CONF-801107-37
Contract AT03-76SF71053
ANS international conference, Washington, DC, USA, 17 Nov 1980.

The Federal Republic of Germany (FRG) and the United States (US) are cooperating on certain aspects gas-cooled reactor technology under an umbrella agreement. Under the spent fuel treatment section of the agreement, FRG fuel spheres were recently sent for processing in the Department of Energy sponsored cold pilot plant for High-Temperature Gas-Cooled Reactor (HTGR) fuel processing at General Atomic Company in San Diego, California. The FRG fuel spheres were crushed and burned to recover coated fuel particles. These particles were in turn crushed and burned to recover the fuel-bearing kernels for further treatment for uranium recovery. Successful completion of the tests described in this paper demonstrated the applicability of the US HTGR fuel treatment flowsheet to FRG fuel processing. 10 figures. (ERA citation 06:003508)

HEDL-SA-1977 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Sodium.
27 Sep 79, 9p
Contract AC14-76FF02170

Some of the properties of sodium are reviewed, particularly its properties which make it useful as a FBR coolant. The FFTF and other sodium research facilities at HEDL are described. (ERA citation 06:003688)

INFCE/DEP/WG-1/8 PC **A09**/MF **A01**
INFCE Working Group 1. Secretariat.
Questionnaire Used and Responses Obtained by sub-Group 1C on the Subject of the Impact of National Policies and Constraints on Nuclear Fuel Exploration, Marketing and Assurance of Supply.
176p
U.S. Sales Only.

Information on existing national policies and incentives for uranium and thorium exploration, mining, export, import and stockpiling of nuclear fuel and measures which are being adopted to promote nuclear industries is presented. (Atomindex citation 11:532310)

NUREG/CR-1818 PC **A03**/MF **A01**
Battelle Pacific Northwest Labs., Richland, WA.
Fuel Performance Annual Report for 1979,
M. Tokar, W. J. Bailey, and M. E. Cunningham.
Jan 81, 44p PNL-3583
See also report for 1978, NUREG-0633.

This annual report, the second in a series, provides a brief description of fuel performance in commercial nuclear power plants. Brief summaries are given of fuel surveillance programs, fuel performance problems, and fuel design changes. References to additional, more detailed, information and related NRC evaluation are provided.

NUREG-0525-REV-3 PC **A09**/MF **A01**
Nuclear Regulatory Commission, Washington, DC. Div. of Safeguards.
Safeguards Summary Event List (SSEL),
John J. Davidson, and Paul H. MacMurdy. Dec 80, 184p
See also Revision 2, NUREG-0525-REV-2.

The List contains nine categories of events involving NRC licensed material or licensees. It is deliberately broad in scope for two main reasons. First, the list is designed to serve as a reference document. It is as complete and accurate as possible. Second, the list is intended to provide as broad a perspective of the nature of licensee-related events as possible. The nine categories of events are as follows: bomb-related events; intrusion events; missing and/or allegedly stolen events; transportation-related events; vandalism events; arson events; firearms-related events; sabotage events; and miscellaneous events.

ORNL/TM-6991 PC **A05**/MF **A01**
Oak Ridge National Lab., TN.
Simulated Fission Product-SiC Interaction in Triso-Coated LEU or MEU HTGR Fuel Particles.
R. L. Pearson, T. B. Lindemer, and E. C. Beahm.
Nov 80, 79p
Contract W-7405-ENG-26

Proliferation issues relating to the use of highly enriched uranium (HEU) have led to an evaluation of the fission product-SiC interaction problems that might arise if low enriched uranium (LEU) or medium enriched uranium (MEU) were used as fissile fuel in HTGR systems. Simulated Triso-coated UO sub 2 , UC sub 2 , and UO sub 2 /UC sub 2 particles mixed with varying amounts of Mo, Ru, Rh, Pd, Ag, and Cd were prepared. These fission products were chosen because, after full burnup, their concentrations are higher in LEU and MEU fuels than in HEU fuel. After the particles were heat treated in the laboratory, their behavior was examined by use of metallography, scanning electron microscopy, and electron microprobe x-ray analysis. (ERA citation 06:003684)

SAND-80-6028 PC **A03**/MF **A01**
Kraftwerk Union A.G., Erlangen (Germany, F.R.). Reaktortechnik.
Investigation of Crud Deposition on Pressurized Water Reactor Fuel Elements.
K. H. Neeb, and R. Riess. Oct 80, 35p
Contract AC04-76DP00789
BMFT-VB-K--77-12, January 1978.

After the first fuel element change, crud deposits from three KWO (Obrigheim Nuclear Power Plant) fuel elements (No. 52, 62 and 64) were removed and investigated. The weight per unit area and chemical composition were determined. exp 58 Co was found to be primarily responsible for the radioactivity of the crud, followed by exp 54 Mn, exp 51 Cr, exp 60 Co, exp 59 Fe and exp 95 Zr. The exp 239 exp 240 Pu, exp 241 Am and exp 242 Cm contents were determined for one series of crud specimens. (ERA citation 06:004781)

18K. Reactor Physics

CONF-800648-20 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
GCFR Shielding Physics Design and Experimental Program.
D. E. Bartine, and C. J. Hamilton. 1980, 17p
Contract W-7405-ENG-26
GCFRP program technical review meeting, San Diego, CA, USA, 4 Jun 1980.

Analysis of the CORE 14 ThO sub 2 axial blanket experiment has produced the following results: The EIR and ORNL ENDF/B-4 data libraries produce similar central reaction rates (+-3% difference) except for the significantly higher exp 232 Th (n, 2n) rate obtained using ORNL ENDF/B-4 data. Both libraries underpredict the central exp 232 Th capture and fission rates with C/E values of 0.93 to 0.96 and 0.88 to 0.90 for C2/F9 and F2/F9, respectively. ENDF/B-5 thorium data produce significantly lower capture rates (-7%) and better fission and (n, 2n) rates (+5% and -6%, respectively) relative to ENDF/B-4 data. The central C/E values were insensitive to the theory and modeling approximations investigated; however, the weighting spectrum utilized in the cross section collapse must be properly matched to the calculated broad-group spectrum. (ERA citation 06:003685)

HEDL-SA-2033 PC **A02**/MF **A01**
Hanford Engineering Development Lab., Richland, WA.
Initial Fuel Load and Criticality, Zero Power and Characterization Testing.
R. A. Bennett, D. H. Jones, J. C. Midgett, O. A. Farabee, and T. L. King. 1980, 23p CONF-800607-89
Contract AC14-76FF02170
American Nuclear Society annual meeting, Las Vegas, NV, USA, 8 Jun 1980.

The core is designed with three flow zones and two zones of fuel density to flatten the radial flux distribution; it has a stainless steel reflector to enhance fast neutron flux levels. The core is divided into three trisectors for ease of refueling by the core in-vessel handling machines. Each trisector contains three control rods and locations for 27 fueled assemblies. One location contains an in-reactor thimble which contains special fission chambers to monitor the startup, and another one contains special accelerometers to measure in-core vibration. Six locations have special steel shim assemblies placed in-core for control and power flattening purposes. 15 figures. (ERA citation 06:003689)

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A094 032/0 PC **A04**/MF **A01**
Analytic Sciences Corp., Reading, MA.
Procedures to Calculate Radiological and Toxicological Exposures from Airborne Releases of Depleted Uranium,
Daniel A. Ensminger, and Sharon A. Bucci. Oct 80, 70p Rept no. TASC-TR-3135-1
Contracts DAAK10-78-C-0364, DAAK10-80-R-0060

The 105mm Armor-Piercing, Fin-Stabilized, Discarding Sabot-Tracered (APFSDS-T), Kinetic Energy XM774 and M735A1 cartridges, developed by the U.S. Army Armament Research and Development Command (ARRADCOM), are intended for use in tanks equipped with an M68 gun. These cartridges, both containing a depleted uranium (DU) penetrator, will provide improved penetration effectiveness over the currently fielded M392 and M728 series of armor-piercing, spin-stabilized, discarding sabot rounds and the M735 APFSDS-T cartridge. A concern of using these munitions is centered on potential radiation and toxicity exposures which may result from scheduled or accidental releases of the DU penetrator to the air as fine particles. Depleted uranium metal is formed as a by-product of the uranium enrichment process, and contains a very small percentage, by weight, of the lighter, faster decaying 234U and 235U isotopes. Thus the activity of DU is much less than that of natural uranium, although chemically both metals have similar properties.

AD-A094 284/7 PC **A06**/MF **A01**
Honeywell, Inc., Hopkins, MN. Defense Systems Div.
Electronic Joint Army/Navy Point Detonating/Delay Fuze.
Final rept. 28 Feb-30 Nov 80,
Wade Williams, and Alan Wendler. Oct 80, 116p
Contract DAAK10-80-C-0049

This report describes work done and achievements made towards the completion of the program objectives. The Requirements Definition, Subsystem Development, Theoretical Analysis, System Integration, and the Reliability Analysis are discussed with an explanation of Fuze operation included in the System Integration section. The conclusion includes a summary of the effort done and recommendations for further work. The requirements for the JAN PD/Delay Fuze are outlined. The Navy and Army Fuze requirements are similar except for weight, setback arming level, spin arming level and arming distance. The different weight requirements require separate Navy and Army penetrators, while the different setback spin and arming distance requirements can be met during assembly with minimal part substitution and a jumper select option.

AD-A094 414/0 PC **A02**/MF **A01**
Delaware Univ., Newark. Dept. of Chemistry.
Molecular Dynamics of Nitramines and High Energy Composite Materials.
Final rept. 1 Oct 76-30 Sep 80,
Thomas B. Brill. Nov 80, 25p AFOSR-TR-81-0029
Grant AFOSR-76-3055

A study of the molecular dynamics of the solid phase of HMX and RDX was undertaken to learn the effects of thermal and pressure stress on these nitramines. Raman, nuclear quadrupole resonance, and nuclear magnetic resonance spectroscopy, mass spectrometry, X-ray methods and computer graphics were or are being employed. A complete analysis of the four polymorphs of HMX as a function of temperature and pressure by using Raman spectroscopy was made. A pressure-temperature phase diagram of the beta-to-delta-HMX solid phase transformation was developed. Computer graphics were employed to examine the inter- and intra-molecular interactions that might play a role in thermal degradation of HMX. The positioning of atoms in the lattice is favorable for HONO, CH2O and N2O formation from the solid materials. Mass spectrometry is being used to examine in detail the possible differences in the product distribution during pyrolysis of the polymorphs of HMX. Nuclear resonance spectroscopy employing both the magnetic and quadrupole moments of nuclei in HMX molecule is being conducted to discover the specific molecular motions as HMX is heated from 77K through the beta-to-delta phase transformation. The results reveal a considerable increase in molecular motion in the lattice as it heats. (Author)

AD-A094 423/1 PC **A06**/MF **A01**
Naval Surface Weapons Center, Silver Spring, MD.
Transparent Tube Studies of Burning to Detonation Transition in Granular Explosives I: Preliminary Framing Camera Studies.
Progress rept. Sep 76-Dec 77,
Harold W. Sandusky, and Richard R. Bernecker. 27 Oct 80, 121p Rept no. NSWC/TR-79-79

Burning of relatively high porosity granular explosive charges, confined in transparent plastic tubes, was photographed with a framing camera. Observed luminous fronts corresponded to the displacement of the charge from the ignitor by the mild gas pressure of the ignitor, an increased rate of displacement once the explosive itself ignited, and the propagation of flame down the charge. Luminous flame velocities were similar to convective ignition front velocities measured by ionization probes in previous steel tube studies. In charges of 94/6 RDX/wax, luminous front velocities were similar to the high order compressive burning which followed the convective ignition front in steel tube studies. Although all these explosives tested previously in steel tube studies achieved a transition from deflagration to detonation, only coarse tetryl (470 micrometers) transited to detonation in the low confinement of the plastic tube. (Author)

AD-A094 599/8 PC **A09**/MF **A01**
Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
Convective Ignition of Propellant Cylinders in a Developing Cross Flow Field.
Final rept. Jun 78-Aug 80,
Aviezer Birk, and Leonard H. Caveny. Sep 80, 194p Rept no. MAE-1486
Contract DAAG29-79-C-0140, Grant DAAG29-78-G-0153
Doctoral thesis.

The sensitivities of ignition delay time and site to the ambient conditions (i.e., flow velocity, pressure, temperature and gas composition) were investigated under high heat flux conditions (e.g., 100 cal/sq cm-s). A shock tunnel was used to provide up to 20 ms of flowing heated gas at: 1 to 22 MPa, 1800 to 2300 K, 5 to 300 m/s. Test gases were 100%N2. 10%O2/90%N2 and 50%O2/50%N2. Instrumentation included radiation detectors, high-speed shadowgraph sequences, pressure probes and heat flux gauges. Most of the tests were conducted with nitrocellulose-based propellants. The effect of high heating rates accompanying the initial flow transients and boundary layer development were very prominent in producing sub-millisecond ignition delays for oxygen-containing flows. Indeed, during their brief period (on the order of 0.2 ms) the heat fluxes are 4 to 5 times higher than the corresponding well developed flow values. Flame blow-off occurred for high Reynolds numbers (e.g., 16,000), low free stream oxygen content flows. Depending on the flow conditions first ignition occurred distinctly at the leading edge, trailing edge or at the flow separation region. Compared to triple-based propellant, single-based and double-based propellants ignited more rapidly in oxygen-containing flows. The experimental results indicate clearly that for the range of ambient conditions tested, the ignition is a gas phase process. The ignition processes in non-steady reactive boundary layer flows were analyzed for the front stagnation flow region. The solution includes the boundary layer development and the transition to quasi-steady burning.

NUREG/CR-1794-V-3 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.

Summary of Activities and Accomplishments, August 1 to October 31, 1979. A Proposal to Develop a Method for the Detection of HE Employing Chemiluminescence Reactions.
Progress rept.,
Michael P. Neary. Jan 81, 12p LA-8595-PR
Contract W-7405-eng-36

The photolytic behavior of HMX, TNT and NQ in acetonitrile and in micellized water solutions has been characterized. Development of the analytical methods for the analysis of the photolysis products of each high explosive (HE) is complete. The use of a micellized solvent as an HE concentrator has been partially studied with encouraging results.

PAT-APPL-6-140 049 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Preparation of Calcium Cyanamide.
Patent Application,
Charles W. Lewis. Filed 14 Apr 80, 10p AD-D008 013/5
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to the economical production of a high purity calcium cyanamide from calcium carbonate and a mixture of ammonia and carbon dioxide in a multistage reactor. The multistage reactor increases the surface area for better contact between solid and gaseous reactants, removes the water formed, thus minimizing the decomposition of the product, and minimizes the cracking of ammonia by lowering the temperature of the reaction. The resulting calcium cyanamide has a purity of at least about 95% and contains no impurities which would deleteriously affect the BAF process. A further advantage is that the essentially pure calcium carbonate obtained as a by-product of the BAF process can be utilized according to the process of the present invention to produce calcium cyanamide employed as starting material in the BAF process.

PAT-APPL-6-142 196 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Wear Reducer.
Patent Application,
Sydney Axelrod. Filed 21 Apr 80, 12p AD-D008 007/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to an improved ammunition propellant composition and method for reducing gun member wear erosion flash and cook-off through use of an additive comprising a mixture of a super water absorbent starch modified polyacrylonitrile which has been subjected to alkaline saponification and water. The wear reducing additive is preferably formed into sheets which can be used with propellants selected from the group consisting of bagged propelling charges and cartridge cased propellants.

PAT-APPL-6-210 981 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Improved Method of Preparing N, N-Bis(2-Fluoro-2,2-Dinitroethyl) Carbamyl Chloride and Its Derivatives.
Patent Application,
W. H. Gilligan, and Michael E. Stizmann. Filed 28 Nov 80, 19p AD-D008 018/4
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to organic explosives and more particularly to fluoronitroorganic explosives. An object is to provide an improved method of producing N,N-bis(2-fluoro-2,2-dinitroethyl) carbamyl chloride. Another object of this invention is to provide a method of obtaining pure N,N-bis(2-fluoro-2,2-dinitroethyl) carbamyl chloride. A further object of this invention is to provide new, more powerful explosive compounds having good thermal and chemical stabilities. Yet another object of this invention is to provide novel compounds which are useful in high energy explosives. Still a further object of this invention is to provide new compounds which are useful as intermediates for the synthesis of other explosive compounds.

PATENT-4 232 314 Not available NTIS
Department of the Navy, Washington, DC.
FM Autocorrelation Fuze System.
Patent,
Donald J. Adrian. Filed 28 Oct 58, patented 4 Nov 80, 4p AD-D008 028/3, PAT-APPL-770 236 Supersedes PAT-APPL-770 236-58.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An FM doppler fuze system comprising means for combining a periodic wave with white noise, white noise being a random mixture of frequencies possessing a constant power spectral density, means for modulating a carrier frequency with said periodic wave plus noise and transmitting a signal in the direction of a target, means for mixing a portion of said transmitted signal and a return echo signal from a target, and means for passing the band of expected doppler frequencies from the output of said mixer to provide an output operable to actuate the detonation circuit of a fuze. (Author)

19C. Combat Vehicles

AD-A950 147/9 PC **A08**/MF **A01**
Human Resources Research Organization, Alexandria, VA.
The Tank Gunner's Guide (M48A1 Tank).
Research product rept.
Oct 57, 174p
Contract DA-49-106-qm-1

No abstract available.

19E. Fire Control and Bombing Systems

PAT-APPL-6-127 014 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Integrated Weapon Control System.
Patent Application,
Bernard L. Lewis. Filed 4 Mar 80, 12p AD-D007 994/7
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a system for integrating weapon control radars which operate at the same or different frequency bands, and for permitting every weapon control radar, for example on a ship, to look through every weapon control antenna, thereby enabling all radars to be used against all targets, includes interconnecting broad-band antennas that can be time - and/or frequency-shared by all the radars. Each antenna has a coaxial monopulse feed at the various bands of operation. Each antenna also includes a switch for time-sharing the radars either simultaneously or sequentially into the antenna. A second switch for each antenna sends the radar outputs associated with each antenna to a control system for that antenna and its associated weapon launcher.

19F. Guns

AD-A950 129/7 PC **A02**/MF **A01**
David Taylor Model Basin, Washington, DC.
The Measurement of Mast Vibration on the Tripod Mast during Gun Trials of the Brazilian Battleship 'SAO PAULO',
William McEntee. May 20, 9p Rept no. DTMB-10

No abstract available.

AD-A950 136/2 PC **A04**/MF **A01**
David Taylor Model Basin, Washington, DC.
60-Inch Turret Stool Models Numbers 1-3 and 10-Inch Model Number 13.
Oct 28, 60p Rept no. DTMB-206

No abstract available.

AD-A950 137/0 PC **A02**/MF **A01**
David Taylor Model Basin, Washington, DC.
Design of Turret Foundations.
Oct 28, 24p Rept no. DTMB-207

No abstract available.

AD-A950 138/8 PC **A02**/MF **A01**
David Taylor Model Basin, Washington, DC.
Full Scale Tests of Turret Foundations.
Jun 30, 16p Rept no. DTMB-261

No abstract available.

19G. Rockets

AD-A094 128/6 PC **A04**/MF **A01**
Air Force Geophysics Lab., Hanscom AFB, MA.
Prediction of Payload Internal Pressure.
Instrumentation papers,
Christopher P. Krebs. 4 Sep 80, 68p Rept nos. AFGL-TR-80-0260, AFGL-IP-290

An analysis of the internal pressure history of sounding rocket payloads as they ascend through the atmosphere was conducted. The analysis was concerned mainly with compressible flow and included the affects of choking. Computer programs were developed that successfully predict the internal pressure from trajectory data. The programs were based on both the theoretical analysis and mathematical models of the flow rates of various venting components used in relieving the payload internal pressure. The mathematical models were developed from empirical data gathered during testing. The payload model can be set up with any combination of relief valves and air filters, and has provisions for including leaks due to doors and seals. Sample program results for several payloads are included along with the program listings. (Author)

AD-A094 210/2 PC **A02**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
The History of the Development and Use of Rockets,
Ling Fugen. 8 Dec 80, 18p Rept no. FTD-ID(RS)T-155-80
Edited trans. of Hang K'ung Chih Shih (China) n11 p16-18 1978, by William Brown.

No abstract available.

PAT-APPL-6-153 469 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
Dye Marker Assembly for Rocket Practice Round.
Patent Application,
Leonard F. Burke. Filed 27 May 80, 13p AD-D008 005/1
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A rocket training round is disclosed to utilize a frangible nose cone containing dye marker material. Upon impact at a target the nose cone breaks thus releasing the dye marker which creates a dye cloud visible within a range of 3,000 meters. (Author)

19H. Underwater Ordnance

AD-A950 127/1 PC **A04**/MF **A01**
David Taylor Model Basin, Washington, DC.
Motions of a Pulsating Gas Globe under Water. A Photographic Study,
D. C. Campbell. May 43, 69p Rept no. DTMB-512

No abstract available.

PAT-APPL-6-197 736 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Anti-Slosh Baffle Compartment Assembly.
Patent Application,
Edward G. Parks, and August J. Troncale, Jr.
Filed 17 Oct 80, 15p AD-D007 999/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An anti-slosh fuel compartment assembly is provided for a vehicle wherein the vehicle has a forward gas pressurized fuel compartment and an aft fuel feeding compartment. The anti-slosh fuel compartment assembly includes an intermediate compartment which is mounted between the forward and aft fuel compartments. A device is provided for sealing the intermediate compartment to the vehicle so that the forward and aft fuel compartments are sealably separated from one another. An upwardly extending tube is mounted in a fore-part of the intermediate compartment with a bottom end of the tube opening into a bottom portion of the forward compartment and a top end opening into a top portion of the intermediate compartment. Another upwardly extending tube is mounted in an after part of the intermediate compartment with a bottom end spaced from the bottom of the intermediate compartment and a top end in communication with the aft compartment so that fuel is communicable from the forward compartment to the aft compartment through the intermediate compartment.

PATENT-4 230 059 Not available NTIS
Department of the Navy, Washington, DC.
Noise Abating Sleeve.
Patent,
George P. Kalaf, and Irvin C. Henschen. Filed 26 Feb 79, patented 28 Oct 80, 4p AD-D008 032/5, PAT-APPL-6-015 076
Supersedes PAT-APPL-6-015 076, AD-D006 006.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

In an acoustic homing torpedo having a transducer section mounted forward of the nose shell, an elastomeric, acoustically transparent sleeve is installed over the torpedo nose section and extends aft of the discontinuity at the transducer/nose section interface, thereby reducing the torpedo self-noise generated by cavitation occurring at the discontinuity. (Author)

20. PHYSICS

20A. Acoustics

AD-A094 060/1 PC **A02**/MF **A01**
Texas Univ. at Austin. Applied Research Labs.
Some Simple Propagation Models for Linear and Parametric Sources in Shallow Water.
Technical rept.,
T. G. Muir. 9 Apr 80, 20p Rept no. ARL-TR-80-22
Contract N00014-75-C-0161
Presented at Conference on Underwater Applications of Nonlinear Acoustics, 10-11 Sep 79, Bath (England).

An existing theory is extended to model the average field of sound propagating from directive sources in a shallow water waveguide. The role of narrow beam sources in the excitation of modes is explored. Sample calculations are given. (Author)

AD-A094 147/6 PC **A02**/MF **A01**
Catholic Univ. of America, Washington, DC. Dept. of Physics.
Resonances in Acoustic Bottom Reflection and Their Relation to the Ocean Bottom Properties.
Interim technical rept. 1 Feb 80-31 Jan 81,
W. R. Hoover, A. Nagl, and H. Ueberall. 14 Jan 81, 24p
Contract N00014-76-C-0430

We have initiated a program to study the resonances in the acoustic reflection coefficient of a layered ocean bottom, patterned after the resonances of sound reflection from fluid or elastic layers. Computer programs have been written for obtaining the reflection coefficient from multilayered fluid or elastic media, with constant or linearly depth-dependent sound velocities in each layer. Resonances are evident in the reflection coefficient both as functions of frequency and of angle of incidence, and are shown to depend on the properties of the layered ocean bottom. Results will be presented in the form of three-dimensional graphs. (Author)

AD-A094 165/8 PC **A02**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Underwater Sound Propagation Paths between Perth, Australia, and Bermuda: Theory and Experiment.
Interim rept. Jan-Jun 80,
J. Northrop, and C. Hartdegen. Aug 80, 17p Rept no. NOSC/TR-585

Oceanic great circle paths of nearly 180 deg of arc exist between the water just west of Perth, Australia, and Bermuda. Archived sound-speed profiles at eight locations along this path were used, along with bathymetric data, as input to the RAYWAVE ray-tracing program to compute the effective horizontal sound speed and propagation loss over slightly different paths of 19,762.9 km and 19,806.8 km range. The sound speeds thus computed were 1480.9 + or - 0.9 and 1479.8 + or - 0.6 m/s, which compare favorably with the previously measured sound speeds (1484.7 + or - 3.7 and 1481.48 + or - 0.6 m/s, respectively). Propagation loss of 162 dB over this propagation path is effectively modeled by assuming spherical spreading out a range of 10 nautical miles and semispherical spreading (15 log r) beyond, plus attenuation of 1.75 dB per 500 nautical miles. The RAYWAVE propagation loss prediction, after adjustment of the propagation path around Crozet Island, is 156 dB in the 10- to 50-Hz band. (Author)

AD-A094 454/6 PC **A02**/MF **A01**
Naval Ocean Systems Center, San Diego, CA.
Verification of the Adiabatic Invariant Approximation for Computing Effective Horizontal Sound Speeds in a Range-Dependent Environment.
Interim rept. Apr-Sep 80,
J. Northrop, R. C. Shockley, and P. G. Hansen. Sep 80, 21p Rept no. NOSC/TR-621

Use of the Adiabatic Invariant Approximation (AIA) for determining horizontal sound speeds in a range-dependent environment has been proposed recently R. C. Shockley, J. Acoust. SOC. AM. 64, 1171 (1978. Because the method provides a great savings in computer time over conventional ray-tracing techniques, it was applied to two very-long-range paths, from Perth, Australia, to Bermuda and to Fernando de Noronha (19763.0 and 14549.3 km, respectively), where measured travel times are available. Results show that the AIA method predicts effective horizontal sound speeds of 1482.3m/s and 1480.4m/s, respectively, for the two propagation paths. These results compare favorably with the measured values of 1484.7 + or - 3.7 m/s and 1480.1 + or - 0.9 m/s. (Author)

20B. Crystallography

AD-A094 200/3 PC **A03**/MF **A01**
Foreign Technology Div., Wright-Patterson AFB, OH.
Crystal Growth and Characterization,
Qian-Zhang Wu, Qing-Han Chen, and Wan-Chun Tian. 19 Nov 80, 30p Rept no. FTD-ID(RS)T-1135-80
Edited trans. of Guisuanyan Xuebao (China) v8 n1 p80-94 Mar 80.

No abstract available.

AD-A094 277/1 PC **A04**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Electrical Engineering.
InGaAsP Quaternary Materials for Near Infrared Detector and Laser Applications.
Final rept. 1 Jan 77-29 Feb 80,
N. Holonyak, Jr., and G. E. Stillman. Jun 80, 64p
Contract N00014-77-C-0086, ARPA Order-3316

In this project we have been concerned with the liquid phase epitaxial (LPE) and vapor phase epitaxial (VPE) growth of this quaternary system. A number of the basic features of the LPE growth of InGaPAs on inP have been identified. InP-In sub 1-x Ga sub x P sub 1-2 As sub z heterostructure lasers and detectors have been constructed and have been studied.

PB81-143612 Not available NTIS
National Bureau of Standards, Washington, DC.
Phase Transitions in Ammonium Nitrate,
C. S. Choi, H. J. Prask, and E. Prince. 1980, 7p
Pub. in Jnl. Appl. Cryst. 13, p403-409 1980.

The phases of ammonium nitrate, NH4NO3, doped with small amounts of NiO or CuO, have been studied by X-ray and neutron diffraction at various temperatures from 80 to 423 K. Results are given.

PB81-144255 Not available NTIS
National Bureau of Standards, Washington, DC.
The Growth of Shaped Crystals from the Melt,
T. Surek, S. R. Coriell, and B. Chalmers. 1980, 12p
Pub. in Jnl. of Crystal Growth 50, p21-32 1980.

A general theory is presented for the time evolution and stability of the crystal shape in meniscus-controlled growth of crystals from the melt. In a meniscus-controlled process, the relationship of the crystal shape to that of the liquid-vapor interface shows up in the observed constancy of the relative angle (phi sub 0) between the crystal and liquid free-surfaces at the crystal-liquid-vapor junction. An experimental technique is described for determining the characteristic values of (phi sub 0) for silicon and germanium. A linear perturbation analysis of the dynamic crystal growth equations is carried out to derive the necessary and sufficient conditions for crystal shape stability in meniscus-controlled growth processes. Application of the analysis is made to Czochralski and floating zone growth, and to techniques which utilize a die shaper (such as the Stepanov and Edge-defined Film-fed Growth (EFG) methods). Specific numerical examples deal with the growth of silicon crystals by the various methods.

PB81-145476 Not available NTIS
National Bureau of Standards, Washington, DC.
Powder Neutron Diffraction Study of Chemically Prepared beta-Lead Dioxide,
Peter D'Antonio, and A. Santoro. 1980, 4p
Pub. in Acta Crystallographica B36, p2394-2397 1980.

Beta-PbO2, tetragonal, P4(2)/mnm, a = 4.9578, c = 3.3878 A,Z = 2, with the Pb atoms located in positions 2(a) and the O atoms in positions 4(f). The structure was refined with the Rietveld method using powder neutron diffraction data collected with a multiple-channel detector up to sin theta/lambda = 0.6/A. Anisotropic thermal parameters were included in the refinement. The O positional parameter was found to be x = 0.3067. The Pb atoms are coordinated by six O atoms, forming an irregular octahedron in which the four equatorial Pb-O distances are 2.1689(7) A and the two axial distances 2.150(1)A.

PB81-149296 Not available NTIS
National Bureau of Standards, Washington, DC.
Field Ion Microscopy of Polycrystalline Iron Whiskers,
D. S. Lashmore, and A. J. Melmed. Aug 78, 2p
Pub. in Jnl. of Applied Physics 49, n8 p4586-4587 Aug 78.

Field ion micrographs of polycrystalline iron whiskers have been obtained for the first time. They indicate that the whiskers possess a two phase structure with one phase most probably alpha-iron

with the other being Fe3C. A high defect density along with the presence of twins seems to be a whisker characteristic.

PB81-857666 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Brillouin Zones. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 120p NERACSPNNT2763
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning theories, mathematical calculations and analyses of brillouin zones, and observations of brillouin zone behavior in general and in specific crystals and crystal lattices. The nature of these zones and physical effects produced by them on crystal properties and electromagnetic wave propagation are also included. (Contains 107 citations, fully indexed and including a table of contents.)

20D. Fluid Mechanics

AD-A094 078/3 PC **A05**/MF **A01**
Dynamics Technology, Inc., Torrance, CA.
A Nonlinear Stability Theory for Plane Boundary-Layer Flows
Technical rept.,
Toshi Kubota, Tony Chan, A. K. Liu, and Suphi Ozgur. Jul 80, 91p Rept no. DT-7802-11
Contract N00014-77-C-0005

A nonlinear stability theory for two-dimensional disturbances in plane boundary layers has been developed. The mathematical formulation and a discussion of the numerical method and results are presented. The basic assumptions made in the formulation are: the amplitude of disturbances is small, the rate of change of the undisturbed boundary layer with streamwise distance is small, and the rate of amplification of disturbances is small. The computation was checked against published results for plane Poiseuille flow and the Orr-Sommerfeld solutions for Blasius flow and a numerical solution of Navier-Stokes flow along a flat plate. The present theory agrees well with published results for these flow fields. (Author)

AD-A094 142/7 PC **A02**/MF **A01**
Princeton Univ., NJ. Dept. of Mechanical and Aerospace Engineering.
Flow Field and Energy Balance According to the Spatial Linear Stability Theory of the Blasius Boundary Layer.
Technical rept.,
Francis R. Hama, David R. Williams, and Hermann Fasel. 1979, 16p
Contract N00014-76-C-0414
Pub. in Laminar-Turbulent Transition, p73-85 1979. Presented at the IUTAM Symposium, 16-22 Sep 79, Stuttgart (West Germany).

No abstract available.

AD-A094 188/0 PC **A02**/MF **A01**
Texas A and M Univ., College Station. Dept. of Physics.
Relationships between Elements of the Stokes Matrix,
Edward S. Fry, and George W. Kattawar. 16 Jan 81, 14p Rept no. 15
Contract N00014-80-C-0113

Although there are sixteen elements of the Stokes Matrix, they are constructed from basically four amplitudes and three phase differences. This of course implies that there exists nine independent relationships connecting the elements. These relationships are equalities for scattering by a single particle in a fixed orientation and in a fixed direction. They become inequalities when Stokes matrices from an ensemble of particles differing in size, orientation, morphology, or optical properties are added incoherently. These relations will prove to be very useful for providing consistency checks on experimental measurements of all sixteen elements. (Author)

AD-A094 394/4 PC **A03**/MF **A01**
Sheffield Univ. (England). Dept. of Chemical Engineering and Fuel Technology.
Investigations of Eddy Coherence in Jet Flows.
Interim rept.,
A. J. Yule. Jun 80, 29p AFOSR-TR-81-0025
Grant AFOSR-77-3414
Presented at the International Conference on the Role of Coherent Structures in Modelling Turbulence and Mixing, Madrid, 25-27 Jun 80 and the AIAA Aerospace Sciences Meeting (18th), Pasadena, CA, 14-16 Jan 80, Paper AIAA-80-0077.

In turbulent shear flow the term Coherent Structures refers to eddies which are both spatially coherent, i.e. large eddies, and also temporally coherent i.e. they retain their identities for times which are long compared with their time scales in fixed point measurements. In certain cases, for example transitional flows, the existence of such structures is evident from flow visualisations. However in many other flows, and in the complex flows usually found in practical situations, such structures are not so evident although an evaluation of the reasons for the existence of these two classes of flows is first given. Attention is then focused upon the more difficult flows, particularly the round turbulent jet, where coherent structures are not so evident, and upon techniques by which the existence (or non-existence) of such structures in these flows, can be established from point measurements, backed up by flow visualisations. A major problem is shown to be the need to discriminate between real losses in eddy coherent and apparent losses in coherence introduced by phase scrambling effects which smear multipoint correlations. The analysis of multiprobe time dependent data in cold and reacting round turbulent jets is described and its is shown how evidence of strong eddy coherence can be extracted from data in spite of small values of the classical statistical cross-correlations. (Author)

AD-A094 413/2 PC **A02**/MF **A01**
Sheffield Univ. (England). Dept. of Chemical Engineering and Fuel Technology.
Phase Scrambling Effects and Turbulence Data Analysis,
A. J. Yule. 1980, 21p AFOSR-TR-81-0026
Grant AFOSR-77-3414
Pub. in Proceedings of International Symposium on Turbulent Shear Flow, (2nd) p263-281 1980.

No abstract available.

AD-A094 431/4 PC **A02**/MF **A01**
Aeronautical Research Associates of Princeton, Inc., NJ.
A Model of the Structure of Homogeneous Turbulence.
Scientific rept.
Oct 80, 24p AFOSR-TR-81-0034
Contract F44620-76-C-0048

We propose to generalize well-known transport equations for turbulent flows so that they are assumed to apply to two-point correlation functions. We use analogy with their one-point counterparts to which they are required to reduce as the separation of the two points is made to vanish. In order to illustrate the development of this program, we concentrate in this report on homogeneous turbulence at high Reynolds numbers so that the two one-point models needed are the dissipation model and the redistribution model. Both models have been used successfully for such a long time that it is difficult to assign rigidly their originators. They have acquired special importance in the recent developments of turbulent transport calculations.

AD-A094 533/7 PC **A05**/MF **A01**
Naval Research Lab., Washington, DC.
A Comparison of Two-Step Time Integration Schemes for the Finite Element Advection Equation.
Memorandum rept.,
Richard A. Skop, and George A. Keramidas. 19 Jan 81, 92p Rept no. NRL-MR-4438

Numerical studies of two explicit, two-step time integration techniques for the one dimensional, constant velocity finite element advection equation have been conducted for both square hill and cosine hill density distributions. One of these integration techniques, the Godunov scheme, is first order accurate in time while the other, the Lax-Wendroff scheme, is second order accurate in time. The results show that, overall, the 'best' numerical solutions are obtained by combining a central weighted first-step Lax-Wendroff time integration with parabolic spatial discretization either in its full or condensed M matrix form. Both the standard and central weighted first-step Godunov time integrations are found to be numerically diffusive. This diffusivity tends to override whatever spatial discretization is used. (Author) However, the positivity property possessed by the Godunov schemes can be valuable for many applications.

AD-A094 565/9 PC **A02**/MF **A01**
Lockheed Missiles and Space Co., Inc., Huntsville, AL. Huntsville Research and Engineering Center.
TRAN72 Computer Code Modified for Use with RAMP and VOFMOC Flowfield Codes. User's Guide,
P. R. Sulyma, and L. R. Baker, Jr. Oct 74, 14p
Rept no. LMSC-HREC-TM-D390409
Contract NAS9-13429

This document presents a description of the modifications made to the TRAN72 computer program to meet the general requirements of Lockheed's two-phase flow analysis computer programs (specifically the reacting multi-phase computer program), and provides instructions for operating the modified TRAN72 program. The modified TRAN72 program is available for external distribution.

AD-A094 575/8 PC **A07**/MF **A01**
Minnesota Univ., Minneapolis. Dept. of Mechanical Engineering.
Experimental and Computational Studies of Heat Transfer in Complex Internal Flows.
Summary rept. no. 1, 15 Sep 79-15 Dec 80,
Ephriam M. Sparrow, and S. V. Patankar. Jan 81, 130p
Contract N00014-79-C-0621

The details of five distinct pieces of research are set forth in this report. These research problems are interrelated in that they deal with various aspects of complex duct flows. Four of the research problems are experimental in nature. The first deals with the influence of plenum chamber geometry on the heat transfer and fluid flow characteristics in tubes situated downstream of the plenum. In the second experimental problem, the mixing of fluids of different temperatures in a tee is studied. The third experiment is focused on the fluid flow (without heat transfer) in arrays of longitudinal fins, while the last of the experiments treats a nonuniformly heated noncircular duct. The objective of the analytical work was to develop a turbulence model for rectangular passages, and one of the test cases for the model was to predict the friction factors that had been measured for the longitudinal fin arrays. (Author)

AD-A094 614/5 PC **A06**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Numerical Solution of Steady and Periodically Pulsed Two-Dimensional Turbulent Free Jets.
Technical rept.,
Joseph C. S. Lai, and J. M. Simmons. Apr 80, 122p

The flow fields of a steady and a periodically pulsed two-dimensional turbulent free jet have been studied by solving the thin shear layer equations by the Keller Box method in transformed variable form. A constant eddy-viscosity formulation was used to model the Reynolds shear stress term. For the steady jet, calculations agree well with documented experimental data. Computed results of the unsteady jet indicate that the mean flow characteristics follow closely those of the steady jet and compare well with available experimental data. For sufficiently high frequency and amplitude of pulsation or at large streamwise distance, significant unsteady effects occur in the instantaneous quantities. (Author)

20E. Masers and Lasers

AD-A094 117/9 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Dept. of Chemistry.
Continuous Wave Optically Pumped Iodine Laser,
J. Brooke Koffend, Roger Bacis, and Robert W. Field. 31 Aug 78, 12p AFOSR-TR-80-1311
Grant AFOSR-76-3056
Pub. in Jnl. of Molecular Spectroscopy, v77 p202-212 1979.

No abstract available.

AD-A094 192/2 PC **A03**/MF **A01**
Air Force Wright Aeronautical Labs., Wright-Patterson AFB, OH.
Experiments with a Supersonic Multi-Channel Radial Diffuser.
Final rept. Nov 78-Sep 79,
Siegfried H. Hasinger, and Howard L. Toms, Jr. Sep 80, 48p Rept no. AFWAL-TR-80-3029
See also Rept. no. AFWAL-TR-80-3028.

A supersonic radial flow diffuser of the type to be used for high energy radial flow lasers was investigated in cold flow experiments. The diffuser consisted of a multitude of small channels and it was the main purpose of the investigations to optimize the geometry of these channels. The nominal inlet Mach number of the diffuser was 3.5 and its axial length-to-diameter ratio referred to the inlet was 0.5. The maximum pressure recovery rate obtained with this diffuser was 80% of normal shock recovery. Selected channels tested individually reached a recovery rate of over 100%. Failure of the diffuser as a whole to reach this performance must be attributed to flow instabilities triggered by flow irregularities inherent to the present radial flow system. (Author)

AD-A094 351/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Experimental Examination of the Enhancement of Gyrotron Efficiencies by use of Profiled Magnetic Fields.
Memorandum rept.,
M. E. Read, K. R. Chu, and A. J. Dudas. 4 Feb 81, 23p Rept no. NRL-MR-4169
Contract DE-AI01-79-ET-52053

An experiment in which the enhancement of the efficiency of gyrotron oscillators through profiling of the magnetic field at the cavity is discussed. Electronic efficiencies to 65 percent were obtained, with power levels of 1-100 kilowatts at 35 GHz. Satisfactory agreement with theory was found. (Author)

AD-A094 399/3 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
A Disc-Loaded Microwave Guide for Laser Applications.
Master's thesis,
Michael B. Tutin. Dec 80, 60p Rept no. AFIT/GEP/PH/80D-11

A brass disc-loaded microwave cavity was built and the feasibility of using it as the pump for an argon ion laser was investigated. The cavity was 3 feet long and its insertion loss was measured to be 6.3 db. The voltage standing wave ratio for an empty cavity was found to be below 1.5 at all frequencies from 2425 MHz to 2475 MHz. A quartz laser tube was inserted in the microwave cavity and filled with .50 torr of argon. A uniform discharge was obtained with 180 W of input power, and a spectral analysis revealed that previously known laser transitions occurred in the discharge. A laser cavity was formed, and a 'fireball' was observed in the discharge. However, attempts to optimize the system to obtain lasing were not completed. It was concluded that improvements must be made to the cavity to decrease the insertion loss and to the power supply to more effectively couple power to the plasma. (Author)

AD-A094 417/3 PC **A06**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Analysis of Dye Degradation Effects on Output Energy of the Pulsed Organic Dye Laser.
Master's thesis,
Alan J. Bridging. Dec 80, 105p Rept no. AFIT/GEP/PH/80D-1

The dominant excitation and relaxation mechanisms found in dye molecules are discussed and then incorporated into a model for the xanthene dye laser. Rate equations for this model are presented which include terms that account for excited state singlet absorption and triplet absorption. The system of rate equations are solved using the steady-rate approximation to derive equations for the threshold pump power and output power of the laser. The output power and threshold pump power equations are modified to include variables that allow the following effects of dye degradation to be examined: dye concentration reduction, reaction product absorption of pump radiation, reaction product absorption of lasing radiation, and singlet quenching by the reaction products. Theoretical values based on available experimental data are derived for these variables. A computer program is used to integrate the output power of the laser over the duration of a flashlamp pulse to compute the pulse energy. The energy decay curves computed using the theoretical data are presented and compared to the experimental pulse energy decay. (Author)

AD-A094 484/3 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Physics and Astronomy.
Competition Effects in Lasers.
Final rept. 1 Oct 75-30 Sep 80,
L. Mandel. Nov 80, 18p AFOSR-TR-81-0021
Grant AFOSR-76-2918

This research dealt principally with the ring laser and the coherence properties of laser light. Among the most interesting discoveries was the fact that a ring laser can simultaneously emit one beam of coherent light and one beam of incoherent light, and when the laser is homogeneously broadened, as is the dye ring laser, microscopic quantum fluctuations have macroscopic consequences in that they cause switching between two modes.

AD-A094 500/6 PC **A06**/MF **A01**
Oklahoma Univ., Norman. Dept. of Physics and Astronomy.
Gaseous Electronics Conference (33rd) Held at Norman, Oklahoma, 7-10 October 1980.
Final rept.,
Robert M. St. John. Oct 80, 120p AFOSR-Tr-81-0015
Grant AFOSR-80-0236

Contents: Electron Collisions I; Breakdown and Corona; Electron Collisions II; Glow Discharges and Boundary-Related Phenomena; Glow Discharges; Workshop on Electron Scattering with Emphasis on Laser Applications: Heavy Particles I; Rare Gas Halide Lasers; Heavy Particles II; Xenon Chloride Lasers; Mercury Bromide and Interhalogen Lasers; Workshop on Kinetic Processes in Electronic Transition Lasers; Excitation Transfer; Distributions and Transport Properties; Metastable Reactions; Attachment; Photon Interactions; Arcs I; Ultraviolet Lasers; Arcs II; Infrared Lasers; Index to Abstracts.

AD-A094 520/4 PC **A02**/MF **A01**
Rochester Univ., NY. Dept. of Physics and Astronomy.
First-Passage-Time Distributions under the Influence of Quantum Fluctuations in a Laser,
Rajarshi Roy, R. Short, J. Durnin, and L. Mandel. 28 Jul 80, 6p AFOSR-TR-81-0063
Grant AFOSR-81-0026
Pub. in Physical Review Letters, v45 n18 p1486-1490, 3 Nov 80.

No abstract available.

AD-A094 542/8 PC **A02**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Power Stabilization Method for a Synchronously Pumped Dye Laser System.
Interim technical rept.,
R. E. Russo, R. Wigtnell, and G. M. Hieftje. 28 Jan 81, 11p
Contract N00014-76-C-0838

The average power stability of the synchronously pumped dye laser can be improved by a factor of more than 5 by altering the optical feedback stabilization circuitry of the conventional laser system. Noise fluctuations in dye laser output power which normally occur are largely eliminated by changes in the pumping power of the ion laser. The slight loss in dye laser output power which is incurred by the beam splitter is largely offset by an increase in available ion laser power. (Author)

AD-A094 544/4 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
Coherent Optical Pulse Evolution in a CO2 Amplifier,
S. M. Hamadani, N. A. Kurnit, and A. Javan. 4 Dec 75, 6p
Contract N00014-76-C-0447
Availability: Pub. in Optics Communications, v17 n1 p32-37 Apr 76 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 546/9 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
Photopreionization of the 3371-A Pulsed N2 Laser,
N. A. Kurnit, S. J. Tubbs, K. Bidhichand, L. W. Ryan, Jr., and A. Javan. 13 Dec 74, 3p
Contract N00014-76-C-0447
Availability: Pub. in IEEE Jnl. of Quantum Electronics, p174-175 Apr 75 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 547/7 Not available NTIS
Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
Sealed Multiatmosphere CO2 TEA Laser: Seed-Gas Compatible System Using Unheated Oxide Catalyst,
R. B. Gibson, A. Javan, and K. Boyer. 13 Feb 78, 2p
Contract N00014-76-C-0447
Availability: Pub. in Applied Physics Letters, v32 n11 p726-727, 1 Jun 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 548/5 Not available NTIS
Massachusetts Inst. of Tech., Cambridge.
XeF Ground-State Dynamics in a Laser Discharge,
S. f. Fulghum, I. P. Herman, M. S. Feld, and A. Javan. 7 Jul 78, 3p
Contract N00014-76-C-0447
Availability: Pub. in Applied Physics Letters, v33 n11 p926-928, 1 Dec 78 (No copies furnished by DTIC/NTIS).

No abstract available.

AD-A094 558/4 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
A Multilevel Model of XeF Ground State Kinetics,
S. F. Fulghum, M. S. Feld, and Ali Javan. 1977, 24p
Contract N00014-76-C-0447

A multilevel model of energy transfer is presented in the XeF ground electronic state due to collision-induced VT and dissociation processes. The model, whose parameters are based on experimental results presented here and on other recent data, should be useful in accurate simulations of output efficiency and multiline laser oscillation in XeF. Effective lifetimes of individual ground state levels, applicable to two level laser models, are determined from the multilevel model. The effective lifetime of the primary lower laser level, $v''=3$ is determined to be 4 to 6 nsec for a 1 atm He buffer.

AD-A094 592/3 PC **A02**/MF **A01**
Stanford Univ., CA. Edward L. Ginzton Lab. of Physics.
Limitation of Rotation Sensing by Scattering,
C. C. Cutler, S. A. Newton, and H. J. Shaw. 16 Jul 80, 4p GL-3150, AFOSR-TR-81-0052
Contract F49620-80-C-0040
Pub. in Optics Letters, v5 n11 p488-490 Nov 80.

No abstract available.

PAT-APPL-6-199 895 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Laser Bottlenecking Technique.
Patent Application,
J. Gary Eden. Filed 23 Oct 80, 25p AD-D008 000/2
Availability: This Government-owned invention available for U.S. licensing and, possible, for foreign licensing. Copy of application available NTIS.

A technique is disclosed for lasing a gas in a gas lasing device to obtain stimulated light emission at a desired wavelength by bottlenecking the high gain transitions in the gas so that certain low gain transitions which will yield the desired wavelength are now able to oscillate. This technique comprises the steps of optimizing the mirror transmission for the desired light frequency, and pumping the laser gas with a pulse whose width is much longer than that required to bottleneck the high gain transitions. This technique may be utilized with both molecular and atomic gases. (Author)

PATENT-4 230 995 Not available NTIS
Department of the Navy, Washington, DC.
Electrically Excited Mercury Halide Laser.
Patent.
Ralph L. Burnham. Filed 24 Oct 78, patented 28 Oct 80, 5p AD-D008 033/3, PAT-APPL-954 377
Supersedes PAT-APPL-954 377-78, AD-D005 473.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

An improved electric-discharge-excited mercury halide dissociation laser operable on the (B-X) transitions in HgCl, HgBr and HgI at 558, 502 and 443 nm respectively. The laser discharge cell is elongated and made from temperature-resistant silicon-glass laminate or any other suitable material and includes separate ceramic crucibles for containing mercuric dihalide crystals. A pair of electrodes, each having external terminals, extend along the linear axis of the cell in parallel relationship with the linear axis and each other. Ultraviolet discharge means is also provided for preionizing a buffer gas of helium to which nitrogen has been added. The improvement comprises the addition of nitrogen to the buffer gas of helium which is admitted to the laser cell prior to excitation. The addition of nitrogen may act to selectively remove the terminal levels of the mercury halide laser transitions, thereby permitting more efficient extraction of the optical energy from the laser media. Thus improvements in both efficiency and output energy are obtained. The laser cavity is completed by a fully and a partially reflective surface for the wavelength of operation. The gasses are preionized and excited by pulsed electrical energy from separate sources. (author)

PB81-143257 Not available NTIS
National Bureau of Standards, Washington, DC.
Piezo-Optic Coefficients of Four Neodymium-Doped Laser Glasses,
R. M. Waxler, and A. Feldman. Aug 80, 12p
Sponsored in part by California Univ., Livermore. Lawrence Livermore Lab.
Pub. in Applied Optics 19, n15 p2481 Aug 80.

The results of measurements of the piezo-optic coefficients of four new laser glasses, one neodymium-doped phosphate glass and three neodymium-doped fluorophosphate glasses, are reported. The measurements were made at 0.6328 micrometers and 1.15 micrometers and, in general, the values are slightly smaller at the longer wavelength. The small values of the coefficients at both wavelengths for certain glasses indicate that these glasses are to be preferred for laser use.

PB81-857385 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Techniques for Laser Applications. January, 1976-December, 1980 (Citations from the Energy Data Base).
Rept. for Jan 76-Dec 80.
Jan 81, 193p NERACEDBNT2874
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning theoretical, experimental, and applied pulse techniques associated with lasers. Considerable attention is given to pulse techniques in laser research and laser technology. (Contains 202 citations, fully indexed and including a table of contents.)

PB81-857393 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Pulse Techniques for Laser Applications. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 173p NERACSPNNT2874
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning theoretical, experimental, and applied pulse techniques associated with lasers. Considerable attention is given to pulse techniques in laser research and laser technology. (Contains 181 citations, fully indexed and including a table of contents.)

PB81-857708 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Carbon Monoxide Lasers. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 87p NERACSPNNT2797
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning the theory, development, operation, efficiency, and applications of various types of carbon monoxide lasers. Typical applications are for nuclear reactions and laser spectroscopy. (Contains 85 citations, fully indexed and including a table of contents.)

20F. Optics

AD-A094 419/9 PC **A10**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Laser Wave-Front Analyzer Software Improvement.
Master's thesis,
Robert C. Sudduth. Dec 80, 215p Rept no. AFIT/GEO/PH/80-10

A software package was written which will analyze annular shaped laser wave-fronts. This involved generating a set of orthogonal polynomials from the Zernike polynomials by using the Gram-Schmidt orthogonalization process. The coefficients of the polynomials are determined by using the orthogonality of the polynomials, instead of using the common least-squares method. The coefficients of the generated polynomials are converted to Zernike coefficients, and both sets of coefficients are presented to the user. By using the first moments of the wave-front's position in the collection array, the software is able to define the basic parameters of the wave-front. These parameters are: center, outside radius, and the obscuration ratio of the wave-front. With these parameters, the soft-ware computes 6, then 11, then 22 coefficients to show the stability of the coefficients. With well-defined circular and annular wave-fronts, the program was consistently able to compute the coefficients with an RMS error of less than 0.050 waves.

AD-A094 439/7 PC **A05**/MF **A01**
Army Missile Command, Redstone Arsenal, AL. Directed Energy Directorate.
Design and Analysis of Afocal, Two-Mirror Systems for Arbitrary Intensity Transformations.
Technical rept.,
Walter LaVaughn Hales, and Dietrich Korsch. Oct 80, 96p DRSMI/RH-81-2-TR, AD-E950 075

Generalized surface equations are developed for reflaxicon and waxicon systems, which allow arbitrary control of the intensity profile of the exit beam. These equations assume axial symmetry of the intensity transformation function. Both the reflaxicon and waxicon systems are analyzed numerically to determine the sensitivity of the aberrations to system misalignment and system design parameters. Design recommendations are made for minimizing the sensitivity of the systems to misalignment. (Author)

AD-A094 525/3 PC **A02**/MF **A01**
Arizona Univ., Tucson. Optical Sciences Center.
Third-Order Approximation of the Displacement of a Caustic Point Due to a Generalized Bending,
Rong-Seng Chang, and Orestes N. Stavroudis.
22 Sep 79, 6p AFOSR-TR-81-0065
Contract F49620-80-C-0022
Pub. in Jnl. of the Optical Society of America, v70 n5 p535-538 May 80.

No abstract available.

AD-A094 563/4 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Single Mode Optical Waveguide Design Investigation.
Progress rept. no. 1, Oct-Nov 80,
V. A. Bhagavatula, R. A. Westwig, and D. B. Keck. 4 Dec 80, 4p

This report outlines the progress made during the period Oct.-Nov. '80, in carrying out the 'Single-mode Optical Waveguide Design Investigation.' The report summarizes the work performed in the following areas: (1) Microbend Sensitivity Test; (2) Fabrication; (3) Equipment Assembly.

AD-A094 611/1 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Ocean Environmental Influences of Temperature and Mechanical Stress on Bare Fiber-Optic Sensors of Acoustic Pressures. Part II.
Final rept.,
Sam Hanish. 21 Jan 81, 48p Rept no. NRL-8425

The effect of extraneous (environmental) mechanical stress on the state of polarization of light signals in fiber-optic sensors of acoustic pressure is investigated. After review of the relevant theory of the propagation of polarized light in a dielectric waveguide and of photoelastic coupling, more specific cases of the birefringent effects of mechanical stress are theoretically analyzed and numerically calculated. It is concluded that these effects are negligible in the cases treated except for fibers subject to equal and opposite forces along a diameter or subject to random pressure fluctuations. Estimates of differential changes in the index of refraction in silica fibers due to (elastic) stress-induced birefringence are furnished. (Author)

PAT-APPL-6-140 646 PC **A02**/MF **A01**
Department of the Army, Washington, DC.
A Flowing Gas Discharge Source of Vacuum Ultraviolet Line Radiation System.
Patent Application,
George M. Thomson, and Keith A. Jamison. Filed 16 Apr 80, 11p AD-D008 008/5
Portions of this document are not fully legible.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a flowing gas source of vacuum ultraviolet line radiation system capable of operating efficiently at low pressures and low power levels. The system includes a source body assembly having nozzle member with an orifice on one end for sustaining an electrical discharge; a vacuum vessel for providing an evacuated region outside the orifice; a cooling jacket over a gas tubular element; and an insulator mounted upon the tubular element by vacuum coupling separating the source body electrically from the vacuum vessel. The vacuum ultraviolet radiation is derived from an electrical discharge sustained in a gaseous/vaporous media which flows through a differentially pumped orifice. The inherent differential pumping at the nozzle orifice results in a reduced gas load to instrumentation which may be operatively connected to the output port of the vacuum vessel.

PAT-APPL-6-189 401 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
A Method and Apparatus for Measuring Optical Coupling Coefficients.
Patent Application,
Steven C. Sietel, James O. Porteus, and William N. Faith. Filed 19 Sep 80, 15p AD-D007 997/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus and method for measuring optical coupling coefficients is disclosed using the thermal expansion of a sample to reduce an externally applied tensile load of predetermined magnitude. The sample is illuminated with a known amount of incident energy. The absorption of this energy expands the sample which reduces the tension in the sample. The measurement of the tension reduction permits a direct calculation of the coupling coefficient alpha, through use of the known parameters of a sample.

PAT-APPL-6-195 147 PC **A03**/MF **A01**
Department of the Air Force, Washington, DC.
Atmospheric Dispersion Corrector.
Patent Application,
E. P. Wallner. Filed 8 Oct 80, 27p AD-D008 046/5
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

The instant invention overcomes the problems encountered in the past by providing an atmospheric dispersion corrector which is applicable for use with telescopes having large apertures of, for example, up to 25m in diameter and having a broad spectral bandpass of, for example, 350-1300nm. The instant invention not only provides an atmospheric dispersion corrector which provides broadband correction over the visible and near i.r. spectrum as well as giving small residual errors after correction but also provides a method for optimizing the design of such correctors as well as providing a method for the selection of appropriate glass types which will yield the above-mentioned desirable effects. The atmospheric dispersion corrector of this invention is made up of a housing which is capable of mounting therein two glass prisms, rotatable with respect to each other as well as rotatable as a unit respect to an object being viewed. For optimum results the housing is also capable of mounting therein two compound prisms, each compound prism being made of two components in the form of prisms of different glass types fixedly secured to each other. In this instance each compound prism is rotatable with respect to the other as well as both compound prisms being rotatable as a unit with respect to the viewed object.

PAT-APPL-6-203 003 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Light Burst Activity Analyzer.
Patent Application,
Hugh D. Copeland. Filed 3 Nov 80, 22p AD-D008 001/0
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

An apparatus is provided for analyzing the structure of light burst activity which is generated by a particular light source, such as a group of bioluminescent organisms. The apparatus includes a photon detector for detecting discrete photons of light occurring proximate to the source during each sampling time in a series of sampling times, and further includes a counter coupled to the photon detector for providing successive photon counts, a photon count being the number of discrete photons detected by the photon detector during one of the sampling times. A pulse height analyzing device is coupled to the counter for providing a distribution of the photon counts over the sampling time series. (Author)

PAT-APPL-6-210 114 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Pressure Formed Fiber Optic Connector.
Patent Application,
Donald B. Forman. Filed 24 Nov 80, 9p AD-D008 017/6
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available.

A connector for holding and aligning optical fiber waveguides is produced by subjecting a tube encompassing a wire mandrel to a high-energy forming process which forms the tube into an arcuate shape having a bore for receiving the ends of the waveguides. (Author)

PAT-APPL-6-215 213 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Rotating Shutter System for Improving the Resolution of a Visual Display System.
Patent Application,
Dorothy M. Baldwin, and Frank J. Oharek. Filed 11 Dec 80, 21p AD-D008 021/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A rotating shutter system for improving the resolution of a visual scene projected upon a spherical screen by a 360 deg non-programmed visual display system. A rotating shutter, which has on its upper surface a plurality of opaque radial lines, is positioned within an annular probe of the 360 deg non-programmed visual display system so as to improve the resolution of the annular probe. A direct current motor drives the rotating shutter at a predetermined rotational speed, and a feedback circuit maintains the rotational speed of the direct current motor at a constant value. (Author)

PATENT-4 239 392 Not available NTIS
Department of the Air Force, Washington, DC.
Grating Output Wavefront Sampling System.
Patent,
Richard H. Pohle. Filed 7 Jul 78, patented 16 Dec 80, 6p AD-D008 061/4, PAT-APPL-922 602 Supersedes PAT-APPL-922 602-78, AD-D005 220.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A grating output wavefront sampling system having a plurality of weak gratings located on the last mirror of a beam expander utilized in conjunction with a quasi-monochromatic light source. The gratings diffract a portion of the projected beam of light to a plurality of wavefront sensors, one sensor being utilized for each grating. Knowledge of the direction of the diffracted beams obtained from the wavefront sensors give information about the direction of the projected beam by virtue of conventional grating equations and Hartmann-subaperture tilt analysis. Consequently, if the wavelength and grating spacing are known, tilt and wavefront accuracy of the projected ray or beam are readily attainable. (Author)

20G. Particle Accelerators

AD-A094 144/3 PC **A02**/MF **A01**
Naval Research Lab., Washington, DC.
Storage-Ring Generation of High-Energy Neutrino Beams.
Interim rept.,
Francis J. Kelly, A. W. Saenz, and H. Ueberall.
31 Dec 80, 16p Rept no. NRL-8457

The storage ring method of generating high-energy neutrino beams provides a source of monoenergetic neutrinos, which can be used for transterrestrial neutrino oscillation studies and for neutral-current neutrino experiments in the laboratory. In this report, we consider several possible storage ring configurations, and estimate their counting rates for scientific and communications applications. (Author)

FERMILAB-80/11 PC **A02**/MF **A01**
Fermi National Accelerator Lab., Batavia, IL.
Fermi National Accelerator Laboratory Monthly Report.
Nov 80, 16p
Contract AC02-76CH03000

A description is given of the resumption of 400 GeV accelerator operation for high-energy physics following a facility shutdown of more than four months. Ellectron cooling has been demonstrated and the results are presented. Tests of the aboveground superconducting magnet string are discussed. An experiment measuring photoproduction of charmed baryons and mesons is summarized. Manuscripts, notes, lectures and colloquia prepared or presented fom October 8 to November 14, 1980 are listed. (ERA citation 06:005214)

ITEF-69(1979) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Superconducting Magnet "Hyperon". Design Specific Features and the Results of Testing.
I. A. Vetlitskii, A. V. Belonogov, and V. A. Glukhikh. 1979, 28p
In Russian.
U.S. Sales Only.

The results of tests of the superconducting magnet "Hyperon" are dicussed. This magnet is a front part of the short-lived particle channel. The specific features of the magnet design, the action of the electromagnetic forces, the short-circuit effects, the cooling process, the check out system and achieved parameters are described. The system has been operated for three runs, each of about a hundred hour duration. At a transport current of 2500 A a central field of 6.3 T was achieved. The stored energy is 22.3 MJ. The apparatus works reliably. (Atomindex citation 11:531927)

JINR-R-7-12707 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Calculation of Charge-Exchange Process Effect on Nitrogen Ion Yield from the Cyclotron Source.
V. B. Kutner, and V. I. Kochkin. 1979, 7p
In Russian.
U.S. Sales Only.

Charge-exchange processes between ions, ions and atoms of discharge plasma have been included in the model of generation and losses of ions in gaseous discharge ion source. The evaluation of influence of charge-exchange processes on the yield of multicharged N ions have been made. Charge-exchange processes with single-electron capture have been considered in the model. Numerical calculations showed that charge-exchange processes with sigma approximately 10 exp -15 cm exp 2 decreased N exp +5 ions yield by the factor 1.5. The calculation results correspond to experimental data. (Atomindex citation 11:531895)

JINR-R-9-12463 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Second-Order Approximation of Particle Motion in the Fringing Field of a Dipole Magnet.
N. I. Tarantin. 1979, 20p
In Russian.
U.S. Sales Only.

The radial and axial motion of charged particles in the fringing field of an arbitrary dipole magnet has been considered with an accuracy of the second order of small quantities. The dipole magnet has an inhomogeneous field and oblique entrance and exit boundaries in the form of second order curves. The region of the fringing field has a variable width. A new definition of the effective boundary of the real fringing field of the dipole magnet is used. A better understanding of the influence of the fringing magnetic field on the motion of charged particles in the pole gap of the dipole magnet has been obtained. In particular, it is shown that it is important to take into account, in the second approximation, some terms related formally to the next approximations. The results are presented in a form convenient for practical calculations. (Atomindex citation 11:531922)

JINR-R-9-12613 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Electromagnetic Excitation of the Cylindrical Semi-Infinite Coaxial Waveguides by a Stationary Distributed Modulated Current.
A. Sh. Irkegulov, E. I. Urazakov, and A. B. Shvachka. 1979, 14p

In Russian.
U.S. Sales Only.

The problem of excitation of the symmetrical (p=0) electromagnetic waves in the system of semi-infinite coaxial round tubes with the displacement of the ends was solved by the method of Fourier transformation, which was applied to the system of integral equations of Wiener-Hopf-Fock type. The source of the excitation is a ring with monochromatic current (the magnetic dipole), which was placed on the axis of the waveguide system. The problem was solved for different locations of source. The values of field, flux and energy density of the electromagnetic field in the wave zone are calculated. It is shown, that the diagram of the directivity of the radiation flux has one maximum for angles pi /2< =phi< pi (the angle phi is accounted in opposite clockwise from the axis of waveguide system). The excitation of the fixed waveguide system by the monochromatic current is simulated via computer. (Atomindex citation 11:531889)

20H. Particle Physics

AD-A094 529/5 PC **A03**/MF **A01**
RAND Corp., Santa Monica, CA.
Faster-than-Light Particles: A Review of Tachyon Characteristics.
Interim rept.,
Edward A. Puscher. Oct 80, 44p Rept no. RAND/N-1530-AF
Contract F49620-77-C-0023

This report documents an analytical prediction of some of the characteristics which presently undiscovered faster-than-light sub-atomic particles (called tachyons) must possess if they are to exist without violating the Theory of Special Relatively. A brief review of necessary concepts from the Special Theory is included so that the reader might more readily understand the reasoning as it is developed. Necessary, but not all, characteristics of tachyons are then identified and presented. Finally, an interesting potential relationship between tachyons and anti-gravity is discussed. (Author)

BNL-28354 PC **A02**/MF **A01**
Brookhaven National Lab., Upton, NY.
Charm Baryons: Observed in Bubble Chambers.
N. P. Samios. 1980, 17p CONF-800763-4
Contract AC02-76CH00016
Baryon 80 conference, Toronto, Canada, 14 Jul 1980.

The production and decay of charm baryons as observed in bubble chambers and initiated, as it happens, by neutrinos are reviewed. In particular, the experimental data with respect to the lambda /sub c/ exp + , sigma/sub c/ exp + + , and sigma/sub c/ exp + charm baryons are discussed. 8 figures, 2 tables. (ERA citation 06:004304)

BNL-28498 PC **A04**/MF **A01**
Brookhaven National Lab., Upton, NY.
Hadronic Physics of Q Anti Q Light Quark Mesons, Quark Molecules and Glueballs.
S. J. Lindenbaum. Oct 80, 68p CONF-800778-1
Contract AC02-76CH00016
18. course: the high energy limit, Erice, Trapani, Italy, 31 Jul 1980.

A brief introduction reviews the development of QCD and defines quark molecules and glueballs. This review is concerned primarily with u, d, and s quarks, which provide practically all of the cross section connected with hadronic interactions. The following topics form the bulk of the paper: status of quark model classification for conventional u, d, s quark meson states; status of multiquark or quark molecule state predictions and experiments; glueballs and how to find them; and the OZI rule in decay and production and how glueballs might affect it. 17 figures, 1 table. (ERA citation 06:004318)

CEA-CONF-4746 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Pion Photoproduction on Light Nuclei.
P. E. Argan, G. Audit, N. de Botton, J. L. Faure, and J. M. Laget. 1979, 1p CONF-790847-22(Abst.)
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

No abstract available.

CEA-CONF-4751 PC **A03**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
Dissipation and Nuclear Collective Motion.
H. Hofmann, A. S. Jensen, C. Ngo, and P. J. Siemens. 1979, 40p CONF-790660-8
Conference on large amplitude collective nuclear motion, Lake Balaton, Hungary, 10 Jun 1979.
U.S. Sales Only.

This contribution is intended to give a brief summary of a forthcoming paper which shall review extensively the linear response theory for dissipation and statistical fluctuations as well as its application to heavy-ion collisions. It shall contain new results on the following subjects: numerical computations of response functions and transport coefficients; dissipation in a self-consistent treatment of harmonic vibrations; introduction of collective variables within a quantum theory. The method used consists of an extended version of the Bohm and Pines treatment of the electron gas. It allows one to deduce a quantum Hamiltonian for the collective and intrinsic motion including coupling terms; discussion and solution of a quantal Master equation for non-linear collective motion are given. Additionally, a somewhat elaborate discussion of the problems of irreversibility is given, especially in connection with a treatment within the moving basis. (Atomindex citation 11:524268)

CEA-CONF-4759 PC **A02**/MF **A01**
CEA Centre d'Etudes Nucleaires de Saclay, Gif-sur-Yvette (France). Dept. de Physique Nucleaire.
New Measurement of the Muon Capture Rate in Liquid Hydrogen.
G. Bardin, J. Duclos, and A. Magnon. 1979, 1p
International school of intermediate energy nuclear physics, Ariccia, Italy, 18 - 29 Jun 1979.
U.S. Sales Only.

No abstract available.

CEA-CONF-4792 PC **A03**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Dynamic Deformation Theory of Spherical and Deformed Light and Heavy Nuclei with A = 12-240.
K. Kumar. 1979, 30p CONF-790592-6
International conference on the structure of medium-heavy nuclei, Rhodos, Greece, 1 May 1979.
U.S. Sales Only.

Deformation dependent wave functions are calculated for different types of even-even nuclei (spherical, transitional, deformed; light, medium, heavy) without any fitting parameters. These wave functions are employed for the energies, B(E2)'s, quadrupole and magnetic moments of selected nuclei with A = 12-240 (with special emphasis on exp 56 Fe, exp 154 Gd), and for neutron cross sections of exp 148 Sm, exp 152 Sm. (Atomindex citation 11:524283)

CEA-CONF-4795 PC **A03**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Nuclear Deformation from Fast Neutron Scattering.
G. Haouat. 1979, 39p CONF-7906174-1
International symposium on neutron induced reactions, Smolenice, Czechoslovakia, 25 Jun 1979.
U.S. Sales Only.

Investigations of nuclear deformation through fast neutron scattering are reviewed in some detail. In recent years, experimental methods and techniques have been considerably improved and have permitted precise cross section measurements for neutron elastic scattering and inelastic scattering to the first collective excited levels of a large number of vibrational nuclei. Analyses of these experimental data using the conventional non-spherical optical potential model are discussed with special emphasis on the choice of the optical potential parameterization. The nuclear deformations derived from these analyses are presented and compared to results obtained using other nuclear probes, and to predictions from theoretical calculations. (Atomindex citation 11:524267)

CEA-N-2088 PC **A03**/MF **A01**
CEA Centre d'Etudes de Bruyeres-le-Chatel, Montrouge (France).
Computer Program 'SOMC2' for Spherical Optical Model Calculations.
C. Lagrange, and R. Perrier. Nov 79, 40p
In French.
U.S. Sales Only.

This report is a description of the computer program 'SOMC2'. It is a program for spherical optical model calculations of the nuclear scattering cross sections of neutron, proton and alpha particles. In the first section, the formalism and the non-linear least square algorithm are presented. Section II is devoted to the detailed explanations of all the routines of the present program. A brief explanation of the methods used to obtain not only the fitting parameters, but also their uncertainties and their correlations is given. In section III detailed explanations of the input-data cards and of the various outputs are given. Finally some examples of calculations are presented. (Atomindex citation 11:524286)

CENBG-7903 PC **A06**/MF **A01**
Bordeaux-1 Univ., Gradignan (France). Centre d'Etudes Nucleaires.
Statistical Model Calculations with a Double-Humped Fission Barrier GIVAB Computer Code.
H. Delagrange, and J. Gilat. 1979, 118p
U.S. Sales Only.

Neutron and gamma emission probabilities and fission probabilities are computed, taking into account the special feature of the actinide fission barriers with two maxima. Spectra and cross sections are directly deduced from these probabilities. Populations of both wells are followed step by step. For each initial E and J, decay rates are computed and normalized in order to obtain the de-excitation probabilities imposed by the two-humped fission barrier. (Atomindex citation 11:524241)

CONF-800724-55 PC **A02**/MF **A01**
Illinois Univ. at Urbana-Champaign.
Diffractive Hadronic Production of D Mesons.
L. J. Koester, G. Alverson, and G. Ascoli. 1980, 11p
Contract AC02-76ER03023
20. international conference on high energy physics, Madison, WI, USA, 17 Jul 1980.

A search for charmed D mesons was made with a 217 GeV pi exp - beam on a liquid hydrogen target. The Chicago Cyclotron Spectrometer at Fermilab was used to analyze the hadronic decay of a D meson in coincidence with a prompt muon and a recoil proton. A total of 50 +- 12 D exp +- events were observed with equal numbers in the two channels K exp +- pi exp -+ pi exp -+ . Some of the cuts selected diffractive events. When these cuts were removed the signal remained the same, although the background was greatly increased. The Feynman X and angular distributions were consistent with diffractive production. A diffractive model yielded a cross section of (6 to 10) +- 4 mu b. (ERA citation 06:004306)

CONF-800863-6 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge.
Concluding Remarks. International Conference on Nuclear Physics, Berkeley, California, August 1980.
H. Feshbach. Oct 80, 10p
Contract AC02-76ER03069
International conference on nuclear physics, Berkeley, CA, USA, 24 Aug 1980.

Not a conference summary, these concluding remarks consider five major themes that were illuminated during the conference and the problems within them that need to be resolved in the future. The five topics considered and the following: new

degrees of freedom (single-particle motion, giant resonances, nuclear molecular resonances, nuclear matter, kaon-produced hypernuclei, implications of the bag model and quantum chromodynamics), new forms of matter, new reaction mechanisms (direct vs compound-nucleus reactions, heavy-ion reactions), new aspects of the weak interactions in nuclei (weak neutral currents, P invariance), and new symmetries. 4 figures. (ERA citation 06:004334)

CONF-8010138-1 PC **A02**/MF **A01**
Massachusetts Inst. of Tech., Cambridge. Center for Theoretical Physics.
Constraints on the NN Interaction from Deuteron Electromagnetic Processes. CTP Report No. 893.
E. Hadjimichael, and D. P. Saylor. Oct 80, 6p
Contract AC02-76ER03069
Symposium on perspectives on electro and photonuclear physics, Saclay, France, Oct 1980.

It is shown that deuteron photonuclear data provide considerable evidence that the traditional view of the NN system as two point-like particles interacting via the exchange of mesons may not be valid at separation distances less than 1.5 fm. 3 figures. (ERA citation 06:004336)

CONF-801107-43 PC **A02**/MF **A01**
Oak Ridge National Lab., TN.
Phenomenological Model for Particle Production from the Collision of Nucleons at Medium Energies with Fissile Elements.
F. S. Alsmiller, R. G. Alsmiller, Jr., T. A. Gabriel, R. A. Lillie, and J. Barish. 1980, 9p
Contract W-7405-ENG-26
ANS international conference, Washington, DC, USA, 17 Nov 1980.

A detailed fission channel, including fragment mass, charge, kinetic energy, and excitation energy distributions, has recently been added to the evaporation stage of the Monte Carlo code MECC-7 for nuclear cross sections and particle production. In this code the intranuclear-cascade-evaporation model is applied to nucleon and pion nonelastic reactions at energies between 20 MeV and 3 GeV. The present paper discusses significant revisions to the model. Calculated fission-neutron multiplicities are tabulated for exp 235 U, exp 238 U, and exp 239 Pu. 1 table. (ERA citation 06:004346)

COO-0535-768 PC **A11**/MF **A01**
Colorado Univ., Boulder. Nuclear Physics Lab.
Technical Progress Report.
1980, 242p
Contract AC02-76ER00535

Work carried out at the Nuclear Physics Laboratory of the University of Colorado from November 1, 1979 through October 31, 1980 is summarized. Emphasis was on light ion reaction studies with the AVF cyclotron. The high resolution magnetic spectrometer has allowed studies of nucleon transfer, scattering, and charge exchange reactions throughout the periodic table. More experiments have been run with solid state counters this year than has been the case recently, as a broad range spectra of the light nuclei where only moderate resolution is demanded were examined. Several of these experiments were undertaken for more detailed studies of excitations seen with higher energy probes. Multiple coincidence measurements with neutron and gamma-ray counters have opened a new program in pre-equilibrium reactions and provided a new signature for the study of neutron-deficient final nuclei. The neutron time of flight program has expanded to higher excitations and to use of the (d,n) and (alpha ,n) direct nucleon transfer reactions. Three important experiments were completed at the EPICS pion scattering facility at LAMPF, and other low energy pion scattering data were obtained at TRIUMF. Several (p,d) runs at high energies were accomplished, some with polarized beams at TRIUMF. High-lying structures in medium mass nuclei were studied by the (p,n) reaction at Indiana. Interest in the use of polarized beams has been prompted by the theoretical successes in this area. This interest has led to the study of one - and two-nucleon transfer reactions on a range of nuclei at the Los Alamos tandem and at IUCF. (ERA citation 06:004335)

DESY-80/02 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Search for Narrow Resonances in E exp + E exp - Annihilation at PETRA.
C. Berger, H. Genzel, R. Grigull, W. Lackas, and F. Raupach. Jan 80, 7p
U.S. Sales Only.

We have performed a search for narrow-resonances in the center of mass energy range from 29.90 to 31.46 GeV using the e exp + e exp - storage ring PETRA at DESY. We present the total cross section for hadron production and an upper limit for resonance production, indicating that no bound state of charge 2/3 quarks exists in this energy range. (Atomindex citation 11:530122)

DESY-80/04 PC **A02**/MF **A01**
Deutsches Elektronen-Synchrotron, Hamburg (Germany, F.R.).
Search for Narrow Resonances in E exp + E exp - Annihilation at C.M. Energies Between 29.90 and 31.46 GeV.
W. Bartel, D. Cords, P. Dittmann, R. Eichler, and R. Felst. Jan 80, 10p
U.S. Sales Only.

A search for narrow resonances in e exp + e exp - annihilation at C.M. energies between 29.90 and 31.46 GeV provides no evidence for the existence of such states. The 90% confidence upper limit on the integrated resonance cross section is 38 nB MeV, significantly below the value expected for the lowest (t, anti t) bound state. (Atomindex citation 11:530119)

DOE/ER/03069-T1 PC **A02**/MF **A01**
Hebrew Univ., Jerusalem (Israel). Dept. of Physical Chemistry.
Information Theoretic Analysis of gamma-Ray Multiplicities in Deep Inelastic Collisions.
R. D. Levine, and S. G. Steadman. 1979, 9p
Contract AC02-76ER03069

A constrained phase space approach accounts for the magnitude and the trends of the recently observed variance of gamma-ray multiplicity distributions in deep inelastic collisions. (ERA citation 06:004319)

DOE/ER/03274-1 PC **A05**/MF **A01**
Johns Hopkins Univ., Baltimore, MD.
Nuclear Moments and Nuclear Structure. Annual Progress Report, August 1, 1979-July 31, 1980.
L. Madansky, and Y. K. Lee. 1980, 82p
Contract AS02-76ER03274

Activities of the period August 1, 1979 through July 31, 1980 are reviewed. The results from the relativistic heavy-ion central collisions from the Bevatron are updated, and now represent the most recent evaluation of an energy scan in a search for phase transitions in nuclear matter. The effective cross section for the pion production and additional information, incuding the multiplicity distributions and pi - pi correlations, are obtained. Preparation is underway for an approved experiment using heavier projectiles at the Bevalac, searching for the unusual production of high energy gamma-rays and lepton pairs as signatures for neutral mesons. The importance of such events as an evidence of the onset of phase transition is discussed. A brief summary is given for an alpha-alpha collision experiment at the CERN ISR in the search for unusual behavior in secondary hadron production. The measurement of the pionic x-rays using a bent crystal spectrometer is now analyzed to yield the new value for pionic mass, and upper limit for the muonic neutrino mass. Preparation is underway for the approved experiment at the TRIUMF for the study of the neutron and gamma ray correlation in pi capture. 18 figures, 5 tables. (ERA citation 06:004341)

IAE-3109 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Measurement of Rapidity Spectra of Secondary Particles Emitted in Bombardment of Lead Nuclei by Protons, Deuterons alpha -Particles and exp 12 C Nuclei with 4, 45 (GeV/C)/Nucleon Momenta.
V. G. Antonenko, A. A. Vinogradov, and V. M. Galitskii. 1979, 20p
In Russian.
U.S. Sales Only.

Described are the methods and experimental results on investigation of rapidity spectra of single-charged secondary particles emitted in bombardment of lead nuclei by protons, deuterons, alpha - particles and exp 12 C nuclei with the 4.5(GeV/c)/nucleon momenta. The experimental data obtained are analyzed. Noted is the characteristic peculiarity of the spectra-existence of the maximum at beta approximately 0.5, where beta is the ratio of particle velocity and the velocity of light. Some peculiarities of the maximum behavior are studied as a function of the viewing angle and the kind of incident particles. (Atomindex citation 11:524334)

IAE-3129 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Heavy Nuclei Fission.
G. A. Pik-Pichak. 1979, 12p
In Russian.
U.S. Sales Only.

Equilibrium figures of fissile nucleus are considered in the framework of the drop model with a sharp edge. Obtained are integro-differential equations determining equilibrium figures on the fission barrier and also describing possible new solutions connected with the asymmetry of fragment masses and with the breaking of axial symmetry of fissile nucleus form. The investigation of latter solutions is important for description of fission fragment angular distribution. (Atomindex citation 11:524303)

IAE-3130 PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Atomnoi Energii.
Stability of Saddle Figures of a Fissile Nucleus.
G. A. Pik-Pichak. 1979, 31p
In Russian.
U.S. Sales Only.

The extremum figures of the drop have been determined for various values of divisibility in the framework of the drop model. The estimation of convergence of the results obtained has been carried out. Single-connected figures are under consideration, and drop surface is described by single-valued function of spherical angles. The deformations which break axial symmetry of the drop figures are under study. The stability of equilibrium figures in relation to all practically possible types of deformation has been studied. (Atomindex citation 11:524302)

IFVE-OEF-79-23 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Pi exp - p Implies nu 'N Reaction in the 15-40 GeV/C Momentum Range.
V. D. Apel', K. Kh. Augenstein, and E. Bertolucci. 1979, 11p SERP-E-074
In Russian.
U.S. Sales Only.

Measurements were made of the differential cross sections of the pi exp - p implies nu '(958)n, nu ' implies 2 gamma reaction at momenta of 15, 20, 25, 30 and 40 GeV/c. The experiment was carried out on the IHEP 70 GeV accelerator using the 648-channel hodoscope spectrometer NICE for gamma -ray detection. A total of 6000 nu ' mesons were recorded. A sharp drop is seen in the differential cross section for excitation implies 0. The dependences of the differential cross sections for the reactions pi exp - p implies nu 'n and pi exp - p implies nu n on t are identical. On the basis of the ratio of cross sections for above mentioned reactions R(nu '/ nu)sub(t=0)=0.55+-0.06, the singlet-octet mixing angle for pseudoscalar mesons was determined to be beta =-(18.2+-1.4) exp 0 . (Atomindex citation 11:530114)

IFVE-OEF-79-33 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Pi exp - p Implies pi exp 0 N Reaction in the 15-40 GeV/C Momentum Range.
1979, 20p SERP-E-074

In Russian.
U.S. Sales Only.

A high statistics measurement of the pi exp - p implies pi exp 0 n reaction has been performed at the Serpukhov accelerator for 15, 20, 25, 30 and 40 GeV/c incident pion momentum using the NICE 648-channel hodoscope spectrometer for gamma -ray detection. More than 3 million charge-exchange events have been recorded in total. It is found that the spin-flip amplitudes can be parametrized for small chemically bond t chemically bond, as exponentials with the same slopes to within a few per cent. Also the behaviour of the differential cross section for small and medium chemically bond t chemically bond agrees with the prediction of the geometrical s-channel model which describes binar.v reactions in terms of a complex pole b sub 0 (s). The imaginary part of this universal pole Imb sub 0 (s) has been determined and found to be growing logarithmically with s. (Atomindex citation 11:530113)

INIS-mf-5755 PC **A06**/MF **A01**
Amsterdam Univ. (Netherlands). Zeeman Lab.
Single Neutral Meson Production in Anti Pp Non-Annihilation Reactions at 7.23 GeV/C and 12 GeV/C.
M. Rijssenbeek. 1979, 123p
Thesis.
U.S. Sales Only.

The author describes some aspects and results of the measurement and subsequent analysis of two anti pp bubble chamber experiments at beam momenta of 7.2 GeV/c and 12 GeV/c. The automatic scanning and measuring system for the 12 GeV/c film is discussed. The cross sections of the various two-prong and four-prong final states are presented. Finally, an analysis of the non-annihilation final states consisting of an anti pp pair and a single neutral meson is presented. (Atomindex citation 11:530146)

INIS-mf-5757 PC **A07**/MF **A01**
Vrije Univ., Amsterdam (Netherlands).
Study on Multistep Processes in the (P,p') and (P,D) Reactions on exp 26 Mg.
P. W. F. Alons. 1980, 129p
Thesis.
U.S. Sales Only.

An investigation on the potentialities of direct nuclear reaction studies is presented. The reactions exp 26 Mg(p,p') exp 26 Mg*, exp 26 Mg(p,d) exp 25 Mg and exp 25 Mg(d,d') exp 25 Mg* are studied with emphasis on the effect of multistep processes in these reactions. (Atomindex citation 11:530281)

INIS-mf-5759 PC **A08**/MF **A01**
Amsterdam Univ. (Netherlands).
Lattice Gauge Theories and on Backward Pion-Nucleon Scattering.
L. H. Karsten. 1979, 168p
Thesis.
U.S. Sales Only.

The thesis is in two parts. In the first part the author studies weak coupling perturbation theory of lattice gauge theories. In the second part the author studies the backward pion-nucleon scattering in the framework of an effective action approach. (Atomindex citation 11:529268)

IPNO-TH-79-38 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Parity-Non-Conserving Nuclear Forces.
B. Desplanques. 1979, 21p CONF-790847-20
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

Theoretical and phenomenological approaches to parity-non-conserving nuclear forces are reviewed. Recent developments in the calculation of weak meson-nucleon coupling constants, whose knowledge is necessary to determine theoretically the parity-non-conserving nucleon-nucleon potential, are described. The consistency of different measurements of parity-non-conserving effects is discussed and the information they provide is compared to theoretical predictions. (Atomindex citation 11:524243)

IPNO-TH-79-41 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Rapidly Convergent Method for Solving the Static Hartree-Fock Problem.
M. Di Toro, and F. Duggan. 1979, 5p
U.S. Sales Only.

An improved version of the direct density method for solving the static Hartree-Fock equations is presented. A simple relation with the imaginary time method is exhibited. (Atomindex citation 11:524245)

IPNO-TH-79-43 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Microscopic Calculation of Potentials and Inertia Parameters for Heavy-Ion Collisions.
H. Flocard, D. Vautherin, and P. H. Heenen. Sep 79, 38p
U.S. Sales Only.

Within the adiabatic time dependent Hartree-Fock formalism, the potential V(R) and the inertia parameter M(R) corresponding to the symmetric heavy-ion collisions exp 12 C+ exp 12 C and exp 16 O+ exp 16 O are computed. It is found that the mass M(R) exhibits very sharp peaks. These peaks are shown to provide a plausible mechanism to explain the occurrence of quasi-molecular resonances. (Atomindex citation 11:524250)

IPNO-TH-79-47 PC **A02**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Effect of the Three-Body Potential on the Trinucleon Bound State.
J. L. Ballot, and M. Fabre de la Ripelle. 1979, 7p
International school of intermediate energy nuclear physics, Ariccia, Italy, 18 - 29 Jun 1979.
U.S. Sales Only.

The effect of the three body force, generated by two pions exchange with an intermediate delta , on the trinucleon system is investigated. (Atomindex citation 11:524226)

IPNO-TH-79-55 PC **A03**/MF **A01**
Paris-11 Univ., Orsay (France). Inst. de Physique Nucleaire.
Effects of Collective Modes on the Single Particles States and the Effective Mass of exp 208 Pb.
V. Bernard, and Oct 79, 33p
U.S. Sales Only.

A microscopic particle-vibration model is used to study the single particle energies, spectroscopic factors and nucleon effective mass in exp 208 Pb. The relevant quantities are deduced from the knowledge of the mass operator which is the sum of a Hartree-Fock term and an energy dependent term coming from the coupling to RPA vibrations. The results are discussed and compared with experimental data. The main conclusions are as follows: 1) the gap between the occupied and unoccupied shells is substantially decreased by coupling to the vibrations; 2) the spectroscopic factors in the valence shells are of the order of 0.7-0.8, and in some cases smaller; 3) the values of the effective mass near the Fermi level are about 1.1-1.2. (Atomindex citation 11:524231)

ISN-79-22 PC **A05**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.
Study of the Giant Quadrupole Resonance and Multipole Distribution in Three Calcium Isotopes (Exp 40 Ca, exp 44 Ca, exp 48 Ca) Via exp 3 He Inelastic Scattering.
A. M. Bernolle-Renaud. 1979, 76p
In French.Thesis.
U.S. Sales Only.

This study has shown the important broadening of the giant quadrupole resonance in the non closed shell nuclei. An excitation energy dependence on nuclear radius rather than A/sup -1/3/ has also been observed. Evidence for the equivalent of the low energy octupole resonance has been provided in exp 48 Ca. (Atomindex citation 11:524351)

ISN-79-29 PC **A03**/MF **A01**
Grenoble-1 Univ. (France). Inst. des Sciences Nucleaires.

Multiphonon Ksup(Pi /=0 exp + States in Even-Even Deformed Nuclei. III - Comparison with Boson Expansions in a Realistic Case.
B. Silvestre-Brac, and R. Piepenbring. 1979, 28p
U.S. Sales Only.

Collective K/sup pi /=0 exp + multiphonon states are studied in a realistic case and compared to those obtained by use of two different boson expansions. (Atomindex citation 11:524310)

ITF-79-10R PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Spectrum of Internal and Collective Motions in the Cluster Model.
V. S. Vasilevskij, G. F. Filippov, and L. L. Chopovskij. 1979, 20p
In Russian.
U.S. Sales Only.

The spectrum of internal and collective motions in the Brink model and the resonance group method is investigated. It is shown by considering the two-cluster system (A <=8) that the internal motion in the models under consideration is represented by an infinite set of internal functions with the representation indices (f00) of the group O(A-1), while an infinite set of functions of collective motions corresponds to every fixed internal state. (Atomindex citation 11:530275)

ITF-79-71R PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Description of Two-Particle Interaction on the Basis of the R-Matrix Formalism.
P. N. Nechev, and N. M. Petrov. 1979, 20p
In Russian.
U.S. Sales Only.

The interaction of two particles in a wide energy range is described using the R-matrix theory. As an example the experimental nucleon-nucleon scattering S-phases are described up to energies of 460 MeV. The relations connecting the R-function low-energy parameters with the parameters of effective range theory are obtained. At the higher energy the R-function is reduced on scattering phase and approximated of n-level formula. (Atomindex citation 11:529290)

ITF-79-96R PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
R-Matrix Description of Two-Particle Interaction and Integral Equations for a System of Three Particles.
A. G. Sitenko, P. N. Nechev, and N. M. Petrov. 1979, 23p
In Russian.
U.S. Sales Only.

A three-particle problem is formulated using the R-matrix description of two-particle interaction. The Faddeev equations for a system of three identical particles are reduced to a system of one-dimensional equations whose nuclei are determined by two independent systems of one-dimensional equations. The two-particle interaction the consideration of which guarantees uniqueness of the solution of equations obtained is shown to play an important role within the internal region. The problem of applicability of the boundary-condition model is discussed. (Atomindex citation 11:529320)

ITP-79-22E PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
Cosmological Restrictions on the Equation of State of Hadron Matter.
H. H. V. Borzeszkowski, A. I. Bugrii, F. Muller, and A. A. Trushevsky. 1979, 12p
U.S. Sales Only.

In the model of the hot Universe the possibility of obtaining restrictions on the equation of state of hadron matter based on cosmological observed data is discussed. It is shown that the sound velocity in the hadron era is not sensitive to the Hubble constant value and the temperature of relict radiation at present moment. (Atomindex citation 11:529769)

ITP-79-67E PC **A02**/MF **A01**
Akademiya Nauk URSR, Kiev. Inst. Teoreticheskoi Fiziki.
New Variants of the Faddeev Many-Particle Equations.
B. E. Grinyuk. 1979, 22p
U.S. Sales Only.

The new variants of equations with connected kernels for T-, G-operators and wave functions of N-particle systems with an arbitrary number m(m <= N(N-1)/2) of pair potentials are described. The equations are formulated in terms of the values corresponding to systems of particles with a smaller number of pair potentials; only in particular cases are they the subsystems with a smaller number of particles. (Atomindex citation 11:529252)

JAERI-M-8136 PC **A11**/MF **A01**
Japan Atomic Energy Research Inst., Tokyo.
Graphs of Neutron Cross Section Data for Fusion Reactor Development.
T. Asami, and S. Tanaka. Mar 79, 227p
U.S. Sales Only.

Graphs of neutron cross section data relevant to fusion reactor development are presented. Nuclides and reaction types in the present compilation are based on a WRENDA request list from Japan for fusion reactor development. The compilation contains various partial cross sections for 55 nuclides from exp 6 Li to exp 237 Np in the energy range up to 20 MeV. (Atomindex citation 11:524339)

JINR-E-1-12472 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Multiplicity of the pi exp - Mesons in the Interactions of the 18 GeV/C alpha Particles with Li, C, Ne, Al, Cu and Pb Nuclei.
V. D. Aksinenko, M. Kh. Anikina, and V. S. Buttsev. 1979, 17p
U.S. Sales Only.

Multiplicity distributions of pi exp - mesons from the interactions of 18 GeV/c alpha particles with exp 6 Li, C, Ne, Al, Cu, and Pb nuclei have been obtained with the aid of the 2m streamer chamber. The distributions are compared with those from elementary particle interactions. The A-dependence of the average multiplicity is discussed in terms of several theoretical models (hydrodynamical model (HDM), collective tube model (CIM) and single interaction model. (Atomindex citation 11:524327)

JINR-E-1-12713 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Determination of Cross Sections for exp 12 C-Nucleus Interactions at 4.5 GeV/C Per Incident Nucleon Momentum.
V. D. Aksinenko, M. Kh. Anikina, and V. S. Buttsev. 1979, 7p
U.S. Sales Only.

Interactions of relativistic exp 12 C nuclei with pure nuclear targets C, Ne, Si, Cu, and Zr have been studied in the SKM-200 streamer chamber. The cross sections have been determined for inelastic interactions, =/sup inel/, and for the emission of at least one negative particle, =/sup neg/. An analysis of possible sources of systematic errors has been performed. A comparison is made with results of other experiments and data obtained earlier by the SKM-200 Collaboration for exp 4 He-nucleus interactions. (Atomindex citation 11:524328)

JINR-E-1-12727 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Large-Angle Quasi-Free Scattering in the exp 6 Li(P,Pd) exp 4 He at 670 MeV.
D. Albrecht, M. Csatlos, and J. Ero. 1979, 17p
U.S. Sales Only.

The exp 6 Li(p,pd) exp 4 He reaction was investigated at 670 MeV by a coincidence experiment at large-angle scattering geometry. Energy distributions, cross sections and angular correlations of the reaction products have been measured. Momentum distribution of the recoil nucleus has been determined for transitions leading to residual nucleus in the ground and excited states. Results were analyzed in terms of the simplified distorted wave impulse approximation using the cluster model and three-body wave functions. The observed momentum distribution of the pn pair in the p shell of exp 6 Li is in agreement with three-body calculations. The spectroscopic factor is larger than predicted by theory. Transitions in the ground and excited states of the alpha -particle also have the characteristics of quasi-free scattering on deuteron clusters. (Atomindex citation 11:524329)

JINR-E-2-12535 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Deep Inelastic Hadron-Nucleus Scattering and the Problem of "Bare" Particles.
G. B. Alaverdyan, A. S. Pak, A. V. Tarasov, and Ch. Tseren. 1979, 24p
U.S. Sales Only.

The experimental data on inclusive spectra of protons in the reaction pA implies p+X at 19.2 GeV/c are analyzed in the framework of multiple scattering theory where A is the Al, Cu and Pb nuclei. Theoretical data are given in the form of tables. The calculations show that multiple scattering theory gives a good description of experimental data on inclusive spectra of leading particles and inelasticity coefficients in hadron-nucleus collisions. The reasons of obtaining of "bare" states of leading particles by some authors, who have analyzed the same data, are discussed. The conception of bare particles is considered to be mistaken. (Atomindex citation 11:524219)

JINR-E-2-12675 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
D=(P,p'D)/D=(P,Nd) Ratio for exp 2 Li at Tp=670 MeV Calculated in a Simple Model.
L. Vegh, and J. Ero. 1979, 6p
U.S. Sales Only.

The exp 7 Li(p, p'd) and exp 7 Li(p, nd) quasifree reactions at the energy 670 MeV and backward angle scattering were investigated. The study was carried out in the framework of the alphatriton cluster model of a exp 7 Li nucleus. It was assumed that the elementary processes corresponded to the p<NN/sub 3/sub/ H/ implies Nd reactions where <NN>/sub sub(3/H) were the two-nucleon correlations in the triton-like p-shell of exp 7 Li. The experimental cross section ratio d=(p, p'd)/d=(p, nd) was compared with the theoretical one. The obtained difference between the experimental and theoretical values was explained assuming in the ground state of exp 7 Li the contributions for the exp 4 He- exp 3 H and exp 6 Li-n components equal to 55% and 45% respectively. (Atomindex citation 11:524316)

JINR-E-2-12683 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Momentum Distributions of Deuterons from Quasi-Elastic DD Scattering at High Energies.
L. S. Azhgirey, S. V. Razin, A. V. Tarasov, and V. V. Uzhinsky. 1979, 18p
U.S. Sales Only.

The expressions for the momentum spectra of relativistic deuterons experiencing quasi-elastic (with target deuteron breakup) scattering on deuterons are obtained in the framework of the multiple nucleon-nucleon scattering model. The results of calculations, exhibiting the development of the structure of the high-momentum parts of the deuteron spectra due to the contributions of the various multiple NN scatterings, are given for an initial deuteron momentum of 8.9 GeV/c and scattering angles of 100-160 mrad. It is shown that the contribution of quasielastic dd scattering to the spectrum regions corresponding kinematically to the elastic dd scattering is equal to 15-30%. (Atomindex citation 11:524225)

JINR-E-2-12799 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Secondary Particles Average Multiplicity in Hadron-Nucleus Interactions.
G. B. Alaverdian, A. S. Pak, A. V. Tarasov, V. V. Uzhinsky, and Ch. Tseren. 1979, 15p
U.S. Sales Only.

The mean multiplicity of the secondary particles in hadron-nucleus interactions N-bar/sub hA/ is considered in the framework of the multiple scattering theory. It is shown that predictions of the cascade model of leading particles are in satisfactory agreement with the existing experimental data (according to the uncertainty in inelasticity coefficient in hadron-nucleon interactions). The normalized multiplicity R/sub A/=anti n/sub hA/xanti n/sub hN/ anti n/sub hN/ is the mean multiplicity in hadron-nucleon interactions) depends weakly both on the incident particle energy and on the n-bar/sub hN/. At the same time the value R/sub A/ depends strongly on the value of inelasticity coefficient in hN interactions. Numerical values of R/sub A/ for different kinds of incident particle and the value of the mean number of inelastic collisions of the incident hadron with nucleons inside a nucleus happen to coincide. (Atomindex citation 11:524216)

JINR-E-2-12823 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
KNO Scaling in Hadron-Nucleus Interactions.
G. B. Alaverdyan, A. S. Pak, A. V. Tarasov, Ch. Tseren, and V. V. Uzhinsky. 1979, 18p
U.S. Sales Only.

The relation connecting KNO-functions in hadron-nucleus (hA) and hadron-nucleon (hN) collisions is obtained in the framework of the cascade model of a leading particle with consideration of energy loss fluctuation of the incident particle. The analytical expressions for the first five normalized moments Cp/sup hA/ which determine multiple production in hA collisions are given. The calculation results show that difference between the C/sub p//sup hA/ and C/sub p//sup hN/ quantities is small, but this difference increases with order growth of moments. (Atomindex citation 11:524218)

JINR-E-2-12825 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Correlation of (N/sub S/, n/sub G/) Particles in Hadron-Nucleus Interactions.
G. B. Alaverdyan, A. S. Pak, A. V. Tarasov, Ch. Tseren, and V. V. Uzhinsky. 1979, 18p
U.S. Sales Only.

The (n/sub s/, n/sub g/) particle correlations in the collisions of incident hadron, for example proton or pion, with light (CNO) and heavy (AgBr) components of nuclear emulsion are considered in the framework of the cascade model of a leading particle. The quasielastic scattering of a leading particle and the detection uneffectivity of "anti-leading" particles are taken into account. The comparison of the calculation results with experimental data gives satisfactory agreement. The model reproduces qualitatively the dependence of the mean number n/sub s/ of produced shower particles on the number n/sub g/ of the observed grey particles. (Atomindex citation 11:524217)

JINR-E-4-12722 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Compressibility of Nuclei in the Method of Hyperspherical Functions.
M. Kaschiev, and K. V. Shitikova. 1979, 16p
U.S. Sales Only.

The nature of the monopole giant resonances of light nuclei is studied by the method of hyperspherical functions. The calculations were performed for light nuclei A=4-16 with potentials of the Gaussian type. It is shown that already in the minimal approximation of the method the effect of nuclear "respiration" is taken into account. This effect is illustrated by the results of calculation of the mean-square radii and the densities of the ground and "breathing mode" states. (Atomindex citation 11:530233)

JINR-R-1-12425 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy.
Investigation of the pi exp -12 C Interactions at P/sub pi exp - /=40 GeV/C Accompanied by Emission of Cumulative Pions.
A. I. Anoshin, V. B. Lyubimov, M. I. Solov'ev, D. Tuvdendorzh, and M. K. Suleimanov. 1979, 11p

In Russian.
U.S. Sales Only.

Cumulative events are investigated in the pi exp - 12 C reaction at 40 GeV/c. Cumulative pi mesons are observed in (1.0+-0.1) % cases with energies exceeding kinematically permissible values for pion-nucleon interactions. They are emitted in 80 % cases into the back hemisphere of laboratory system, and in 90 % case they have a positive sign. For events with cumulative pi mesons the growth of multiplicity of all secondary charged particles (pi exp +- , p particles) is observed. The probability of the total carbon nucleus disintegration is increased 5 fold. The inclusive pi meson spectrum has an exponential shape with a parameter slope 5-7 fold less compared to cumulative protons. (Atomindex citation 11:524333)

JINR-R-1-12515 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Isotope Effect in Energy Spectra of Pions Produced by 660 MeV Protons on Ni and SN Isotopes.
Yu. A. Batusov, I. F. Grishashvili, D. D. Dzhalaganiya, and N. I. Konstanashvili. 1979, 8p
In Russian.
U.S. Sales Only.

Studied are production processes of pi exp + and pi exp - mesons by 660 MeV protons on /sup 58, 64/Ni and /sup 112, 124/Sn isotopes at 120 deg angle. Photoemulsion chambers are used for detecting. Dependences of pi exp + and pi exp - meson production cross sections ratios N/sub pi sup(+///N/sub pi sup(-)) on pion energies as well as pi exp + and pi exp - meson spectra are presented graphically. N/sub pi sup(+///N/sub pi sup(-)) values increase with energy for all the isotopes. exp 64 Ni and exp 124 Sn neutron-excess isotopes show a slower growth of the values in comparison with exp 58 Ni and exp 112 Sn isotopes. Isotope effect has been found also in pi meson spectrum lines. (Atomindex citation 11:530120)

JINR-R-2-12471 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Generalization of the Relativistic String Model in the Geometrical Approach.
B. M. Barbashov, V. V. Nesterenko, and A. M. Chervyakov. 1979, 11p
In Russian.International seminar on problems of high energy physics and field theory, Protvino, USSR, 1979.
U.S. Sales Only.

A model is suggested of one-dimensional extended relativistic object, that the surface covered with it in the Minkovski space should have a constant average curvature. A particular case of such surfaces is the world surface of a relativistic string (minimum surface with H=0). The simplest case, when the surface with a constant average curvature is put in the three-dimensional pseudo-Euclidean space, by means of the methods of differential geometry. It is shown that the net of curvature lines on the surface under consideration is simultaneously the isometrical system of coordinates. In this case a set of equations for the coefficients of quadratic surface forms is reduced to the nonlinear equation PHI/sub tautau/-PHI/sub ==/=H/sub sh PHI/, which is the condition of compatibility of the Gauss-Weingarten derivation formulae. By means of the formulae a pair of the Lax operators has been determined. The spectral problem of scattering has been arisen and solved. (Atomindex citation 11:529207)

JINR-R-4-12072 PC **A03**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Microscopic Description of Fast Rotating Heated Nuclei.
A. V. Ignatyuk, and I. N. Mikhailov. 1979, 26p
In Russian.
U.S. Sales Only.

A microscopic model is formulated, which permits one to describe collective excitations in nuclei at large values of the angular momentum and excitation energy over yrast state. A model hamiltonian factorized in the Hartree-Fock-Bogolyubov approximation is chosen. Rotating heated nuclei are described in the single-particle approximation. The method of random phases in the heated nuclei is formulated in the form approaching the standard procedure of hamiltonian diagonalization. Qualitative analysis of secular equation solutions is carried out. The change of the nucleus statistical characteristics following the transition from the regime of two-dimensional rotation of axial nuclei within the range of small spins to the regime of "three-dimensional rotation" with large spins is analyzed. For excitation energies close to neutron binding energy, the calculation of state density increase coefficient K/sub RPA/, caused by coherent effects, gives the value K/sub RPA/ approximately 4-10 for heavy nonmagic nuclei. The obtained values of K/sub RPA/ for deformed nuclei fluctuate comparatively weakly from one nucleus to another, and for temperature increases these fluctuations decrease. (Atomindex citation 11:524271)

JINR-R-4-12650 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Accountancy of the Coulomb Interaction in the Calculation of the pi exp + Meson Elastic Scattering with a Deuteron.
V. B. Belyaev, E. Vzhetsionko, and S. A. Rakityanskii. 1979, 13p
In Russian.
U.S. Sales Only.

Investigated is pi exp + meson elastic scattering on a deuteron at approximately 2 MeV energy of relative motion with provision for the Coulomb interaction. An expression has been obtained for the total amplitude of the process on the assumption that a pion interacts with a nucleon only in the S state. Pion-nucleon potential has been chosen in the center-of-mass separable form. Presented are the results of differential cross section calculation depending on a scattering angle in the system and differential cross section of backward scattering as the function of a energy. It is shown, that at low energy values the exact accountancy of the Coulomb interaction and the approximate accountancy based on the summation of the strong and Coulomb phases provide similar results. (Atomindex citation 11:530198)

JINR-R-6-12733 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems.
Investigation of the exp 155 Dy Decay Scheme.
A. A. Abdurazakov, T. A. Islamov, A. Karakhodzhaev, Ts. Vylov, and K. Ya. Gromov. 1979, 19p
In Russian.
U.S. Sales Only.

Energy levels, intensities, multipolarity of gamma-transitions and internal conversion electrons (ICE) are studied for the exp 155 Dy beta-plus decay. Spectra of gamma-rays are measured using spectrometers with Ge(Li) detectors of the volumes V=0.8 cm exp 3 and 38 cm exp 3 . ICE were studied by means of beta-spectrographs with constant homogeneous magnetic field of 0.03-0.05% resolution. ICE measurements (K and L conversions) were also performed on a spectrometer with a Si(Li) detector positioned in the magnetic field. A new level with 1120 keV energy has been introduced into the exp 155 Dy decay scheme. 50 new gamma-transitions are observed, and for them multipolarities have been determined for the first time. Energies and intensities of gamma-transitions and characteristics of exp 155 Tb levels are defined more accurately. Level nature (parity, spin) is discussed by a model taking account for quasiparticle-phonon interaction. (Atomindex citation 11:524325)

JINR-R-7-12568 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions.
Analysis of Elastic Scattering of exp 40 Ar, / Sup 40, 48/Ca, exp 48 Ti ions on exp 208 Pb.
V. P. Verbitskii, V. N. Polyanskii, K. O. Terenetskii, and Yu. E. Penionzhkevich. 1979, 11p
In Russian.
U.S. Sales Only.

Data on angular distributions of elastic scattering of accelerated exp 40 Ar, exp 40 Ca, exp 48 Ca, exp 48 Ti ions on exp 208 Pb target are analyzed within the optical model. The pentaparametrical optical potential has been used. Up to 500 partial waves in scattering amplitude resolution have been taken into account. The value of strong absorption radius by the optical model agrees well with the results of quasiclassical analysis. (Atomindex citation 11:524318)

LA-UR-80-3278 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Experiment to Search for Finite Mass Neutrinos at Los Alamos.
T. Bowles. 1980, 6p CONF-8010127-1
Contract W-7405-ENG-36
Neutrino mass mini-conference, Cable, WI, USA, 1 Oct 1980.

The strong current interest among physicists of the possibility of finite-mass neutrinos has resulted in several proposals at Los Alamos for experiments to detect nonzero neutrino masses. Three experiments now underway and three proposed experiments at LAMPF are discussed. 1 table. (ERA citation 06:004309)

LA-UR-80-3380 PC **A02**/MF **A01**
Los Alamos Scientific Lab., NM.
Can Massless Neutrinos Dominate the Universe.
E. W. Kolb. 19 Nov 80, 16p CONF-8010127-2
Contract W-7405-ENG-36
Neutrino mass mini-conference, Cable, WI, USA, 1 Oct 1980.

The restrictions from cosmological considerations on masses and lifetimes of neutral, weakly interacting fermions are reviewed. In particular, the possibility that the massless decay products of a heavy neutrino dominate the energy density of the present universe is discussed in detail. 4 figures. (ERA citation 06:004320)

LBL-11513 PC **A07**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Inclusive D Meson Production with the Mark II Detector at SPEAR.
M. W. Coles. Sep 80, 146p
Contract W-7405-ENG-48
Thesis.

Neutral and charged D meson production cross sections were measured at center-of-mass energies between 3.9 GeV and 7.4 GeV. The quantity R/sub D/(=(sigma/sub D exp + +D exp - / + sigma/sub D exp 0 + anti D exp 0 /)/2 sigma/sub mu exp + mu exp - /) is equal to 2 at 4 GeV and 4.4 GeV and about equal to 1 elsewhere. R/sub D/ + 2.5 approximately equals R (sigma/sub hadrons//sigma/sub mu exp + mu exp - /) at all energies. The exclusive cross sections for e exp + e exp - annihilation into D anti D, D* anti D, and D* anti D* were measured at center-of-mass energies between 3.9 GeV and 4.3 GeV. sigma/sub D* anti D*/ decreases with increasing center-of-mass energy from 6.6 +- 1.3 nb near 4 GeV to 3.6 +- .9 nb near 4.3 GeV. sigma/sub D* anti D/ also decreases from 4.2 +- .9 nb to 1.8 +- .6 nb over the same energy region. sigma/sub D anti D/ is less than 0.5 +- .3 nb at all energies. The branching fractions for D* exp + and D* decay were measured. B/sub D* exp 0 implies D exp 0 pi exp 0 / = 0.5 +- .09, B/sub D* exp + implies D exp 0 pi exp + / = 0.44 +- .10, and B/sub D* exp + implies D exp + pi exp 0 / = 0.31 +- .07. At 5.2 GeV, the D meson differential cross section is well described by phase space for e exp + e exp - implies D anti D pi pi or D* anti D* pi pi . Sd sigma/dz was parameterized as A(1-z)/sup n/ with n = 0.9 +- .4. Quasi-two-body production accounts for less than 20% of the total D cross section. No evidence was found for associated charmed baryon-D meson production. An upper limit of 0.4 nb (90% confidence level) was determined for associated production. 41 figures, 12 tables. (ERA citation 06:004310)

LBL-11620 PC **A02**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Properties of Nuclei at Very High Spin.
F. S. Stephens. Sep 80, 16p CONF-800863-7
Contract W-7405-ENG-48
International conference on nuclear physics, Berkeley, CA, USA, 24 Aug 1980.

Nuclear structure at very high spins involves an interplay between collective (often rotational) and noncollective (individual particle alignment) behavior. The new techniques for studying gamma -ray energy correlations promise to give detailed information about both of these aspects of nuclear behavior up to the very highest spins that can be populated. 17 figures. (ERA citation 06:004342)

LBL-11712 PC **A03**/MF **A01**
California Univ., Berkeley. Lawrence Berkeley Lab.
Synthesis and Investigation of Neutron-Rich Transuranium Isotopes.
J. M. Nitschke. Sep 80, 30p CONF-8009116-3
Contract W-7405-ENG-48
International symposium on the synthesis and properties of new elements (IUPAC), Dubna, USSR, 23 Sep 1980.

Spontaneous fission activities produced in the reactions of exp 13 C, exp 15 N, exp 16 O, and exp 18 O ions with exp 248 Cm and exp 249 Bk targets are reported; excitation functions and half-lives of element 104 isotopes are given. Reactions that led to the formation of exp 259 Fm are discussed in detail. The principal features of the SuperHILAC on-line isotope separator and some of the anticipated applications are described. 14 figures, 2 tables. (ERA citation 06:004347)

LPCC-T-79-01 PC **A05**/MF **A01**
Caen Univ. (France). Lab. de Physique Corpusculaire.
Study of Evaporation in Ca + Ca Deep Inelastic Scattering at 400 MeV and Setting-Up of a Conversational Computing System.
A. Ameaume. 1979, 95p
In French.Thesis.
U.S. Sales Only.

The study of inelastic interactions between symmetrical systems allows one calculate the number of nucleons lost by evaporation; the identity of initial particles, within a two body hypothesis in the exit channel, implies a symmetry in the charge and mass distributions of the final nuclei. But these nuclei, in the first stage of reaction, are emitted with some excitation energy, so the observer detects only the cold products resulting from their de-excitation by evaporation. The study of the exp 40 Ca + exp 40 Ca system at 400 MeV, with an E-delta E telescope in the laboratory angular range from 10 to 80 degrees, allowed to calculatation of the number of lost charges delta Z = 20 - Z versus the total excitation energy E/sub x/ of the intermediate system, where Z represents the mean value of charge distributions at fixed E/sub x/ and center-of-mass angle theta. The setting-up of an iterative calculation of delta Z = f(E/sub x/) was necessary to access the E/sub x/ energies before evaporation. The results are consistent with an energy thermalization hypothesis and show a linear increase of delta Z versus E/sub x/, independently of theta. The charge loss rate for one excited calcium varies from 1.6 for E/sub x/ = 50 MeV to 4.8 for E/sub x/ = 150 MeV. (Atomindex citation 11:524331)

LPNHEP-T-78-02 PC **A08**/MF **A01**
Paris-6 Univ. (France). Lab. de Physique Nucleaire et de Hautes Energies.
Comparative Study of the Interactions of 9 GeV/C pi exp - Mesons on Deuterons and Neutrons with Production of Four Charged Particles.
M. C. Touboul. 1978, 158p
In French.Thesis.
U.S. Sales Only.

The following two reactions are analyzed: pi exp - d implies pi exp - pi exp + pi exp - d (1); and pi exp - n implies pi exp - pi exp + pi exp - n (2) and the production of 3 pi systems on neutron and, coherently, on deuteron is compared with special reference to the diffractive production of these systems. In addition the properties of reaction (2) are compared with those of the 'mirror-image' isospin reaction: pi exp + p implies pi exp + pi exp - pi exp + p; these properties should be identical and from their comparison it is possible to see the influence of the target neutron bond in the deuteron and to decide whether a simple shadow effect of one nucleon on the other, calculable by means of Glauber's theory, is enough to explain the difference. (Atomindex citation 11:524184)

LSN-N-79-02 PC **A02**/MF **A01**
Nantes Univ. (France). Lab. de Spectroscopie Nucleaire.
Alpha-Particle Transfer to 0 exp + States in Germanium Nuclei and the Role of Proton Pairing Correlations.
D. Ardouin, D. L. Hanson, and N. Stein. 1979, 11p
U.S. Sales Only.

Proton pairing correlations in the Ge nuclei are studied by means of the Zn(exp 6 Li,d) reactions. The striking behavior observed in the alpha-transfer strength to the ground and first excited 0 exp + states is shown to result from the changing proton structure in these states between N = 40 and 42. (Atomindex citation 11:524335)

LYCEN-7934 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Exchange Currents in the Transitions exp 16 O(0 exp +) implies exp 16 N(0 exp -), exp 16 N(0 exp -) implies exp 16 O(0 exp +), a Still Open Problem.
P. Guichon, M. Giffon, and C. Samour. Jul 79, 4p CONF-790847-21
International conference on high energy physics and nuclear structure, Vancouver, Canada, 13 Aug 1979.
U.S. Sales Only.

Core deformation in exp 16 O could have a similar effect to the OPE current for the ratio rho lambda (sub mu // lambda /sub beta) for the two inverse transitions exp 16 O(0 exp +) implies exp 16 N(0 exp -), exp 16 N(0 exp -) implies exp 16 O(0 exp +). At present time, it is not possible to give a consistent treatment of short range effects, therefore they have been incorporated in a phenomenological parameter phi that multiplies the OPE current. Long range effects have been treated and the IA and OPE matrix elements have been calculated with wave functions that describe core deformation. (Atomindex citation 11:524265)

LYCEN-7953 PC **A02**/MF **A01**
Lyon-1 Univ., Villeurbanne (France). Inst. de Physique Nucleaire.
Critical Opalescence of the Nuclear Pion Field: A Possible Evidence in the M1 (15.11 MeV) Form Factor of exp 12 C.
J. Delorme, M. Ericson, A. Figureau, and N. Giraud. Jul 79, 12p
U.S. Sales Only.

The nuclear pion field for the transition to the 15.11 MeV (1 exp + , T= 1) state of exp 12 C has been computed, evaluating the nuclear polarization with a large basis of nucleon- and isobar-hole excitations. The field shows an enhancement (or critical opalescence) in the momentum region beyond 1.5m/sub pi / which leads to a substantial increase of the second maximum of the M1 form factor. Agreement with experiment can be obtained if the exp 12 C nucleus is much closer to the pion condensation threshold than currently expected. (Atomindex citation 11:524242)

OUP-79-11 PC **A02**/MF **A01**
Oslo Univ. (Norway). Fysisk Inst.
Supersymmetric Dirac Particles.
P. D. Vecchia, and F. Ravndal. 1979, 8p
U.S. Sales Only.

The standard results for a massive Dirac particle coupled to external fields has been derived from a classical Lagrangian which is supersymmetric using proper time methods. (Atomindex citation 11:529330)

PB81-134397 (Order as PB81-134355, PC **A07**/MF **A01**)
Academia Sinica, Beijing (China).
A Relativistic Glauber Expansion for Many-Body System,
Zhu Xiquan, He Zuoxiu, Zhao Weiqin, and Bao Chengguang. 1 Nov 79, 11p
Included in Scientia Sinica, v23 n12 p1522-1532 Dec 80.

According to the composite field theory, using the physical approximation essentially the same as Glauber's, and extending the generalized ladder summation method, the authors obtain an expression of the many-body amplitude of a high energy particle scattering on a composite particle. This expression is a relativistic generalization of the usual many-body Glauber scattering amplitude, including the relativistic recoil of each two body collision and the Lorentz boost of the thickness function.

PB81-857716 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Cerenkov Radiation. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80,
Jan 81, 71p NERACSPNNT2811
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning Cerenkov radiation from relativistic and non-relativistic charged particles and charged-particle beams propagating in a variety of media and/or wave guides. The media range from intergalactic space to crystalline matter, and the wave guides are of various geometric configurations. Both theoretical and observational aspects of Cerenkov radiation are considered as well as natural phenomena associated with it. (Contains 69 citations, fully indexed and including a table of contents.)

RI-106 PC **A02**/MF **A01**
Radievyi Inst., Leningrad (USSR).
Application of Characteristic Level Method to Study on Empirical Formulae for Fragment Production Cross Sections.
E. S. Izosimova, and Yu. P. Yakovlev. 1979, 10p
In Russian.
U.S. Sales Only.

The characteristic level method is used to estimate the parameters of empirical formulae for fragmentation cross-sections. It is shown that with fluctuational approximation the components of empirical formulae describing the dependence of cross-sections on isospins and mass number of target nucleus and fragment can be calculated. A regular dependence for cross-sections in the region of high mass numbers is obtained. (Atomindex citation 11:524272)

RL-79-095 PC **A02**/MF **A01**
Science Research Council, Chilton (England). Rutherford and Appleton Labs.
Note on Some Quasielastic Neutron Scattering Analysis Programs on the Rutherford Laboratory IBM 360/195.
R. M. Richardson. Dec 79, 12p
U.S. Sales Only.

A suite of programs for analysing neutron scattering data from time-of-flight spectrometers has been implemented on the Rutherford Laboratory IBM 360/195 computer system. The programs are intended for near inelastic and quasielastic data and operate by convoluting the measured instrumental resolution function with a model scattering function before fitting to the measured sample scattering law. (Atomindex citation 11:524197)

20I. Plasma Physics

AD-A094 186/4 PC **A08**/MF **A01**
Colorado Div. of Highways, Denver.
Radiation from High Temperature Plasmas.
Final rept. 26 Jun 79-26 Aug 80,
John Apruzese, Edward Kane, Peter Vitello, Dwight Duston, and Adam Drobot. 9 Sep 80, 157p Rept no. SAI-81-239-W/A
Contract N00173-79-C-0448

This report presents analyses of the detailed physical processes of importance in imploding wire and gas puff plasmas. Accurate treatment of the atomic physics and radiation transport underlying the x-ray exchange and output is emphasized. Feedback coupling of radiation and hydrodynamics are examined through use of coupled radiation hydrodynamics codes and analysis of motional Doppler broadening of line radiation.

AD-A094 269/6 PC **A03**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Lower-Hybrid Drift Instability Saturation Mechanisms in One-Dimensional Simulations,
Y.-J. Chen, and C. K. Birdsall. 19 Sep 80, 37p
Rept no. UCB/ERL-M80/40
Contract N00014-77-C-0578

The linear properties and saturation mechanisms of the lower-hybrid drift instability have been investigated using a one-dimensional particle-hybrid simulation. For low drift velocities (V sub d much less than V sub ti), ion trapping and current relaxation (V sub d approaches limit of 0) are competing processes for stabilization. If the relative electron-ion drift velocity is kept constant in time, ion trapping causes the end of instability growth; if this drift is allowed to decrease consistent with momentum balance, then saturation is due to current relaxation. (Author)

AD-A094 305/0 PC **A03**/MF **A01**
California Univ., Los Angeles. Center for Plasma Physics and Fusion Engineering.
Generation and Collapse of Langmuir Solitons in a Nonuniform Plasma,
N. R. Pereira, and G. J. Morales. Nov 80, 29p
Rept no. PPG-529
Contract N00014-75-C-0476

This numerical study considers the effect of a zero order density gradient on the development of Langmuir wave collapse in two dimensions. Two different situations are considered: (1) an initial soliton is perturbed in a direction transverse to the density gradient, and (2) the plasma is resonantly driven by an external pump electric field in the presence of transverse density fluctuations. The principal finding is that the density gradient can inhibit the development of Langmuir collapse for both the initial soliton and the externally driven cases. Over the limited parameter space surveyed it is found that collapse occurs for values of the scaled gradient parameter g < or about = 2.5; where g = (9.8)(M/m) to the 3/2 power (lambda sub D/L), M is the ion mass, m the electron mass, lambda sub D the Debye length, and L the gradient scale length. For larger values of g collapse is not observed. (author)

AD-A094 343/1 MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
Operational Characteristics of a Helium Microwave-Induced Plasma at Atmospheric Pressure.
Interim technical rept.,
Andrew T. Zander, and Gary M. Hieftje. 26 Jan 81, 20p Rept nos. TR-30, 38
Contract N00014-76-C-0838
Availability: Microfiche copies only.

The microwave-induced helium plasma generated at atmospheric pressure in the TM010 resonant cavity is attractive as an excitation source for emission spectrometry. The efficiency of the cavity produces an extremely high energy-density plasma and its short longitudinal dimension permits close spatial and photometric monitoring system proximity between the plasma and different types of sampling devices. Examination of the electron density, excitation temperature and rotational temperature in this microwave plasma reveals its unusual character and suggests certain mechanisms of operation. (Author)

AD-A094 398/5 PC **A04**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Investigation of Electron Loss Processes in CO2/He/N2 Electric Discharges.
Master's thesis,
Greg R. Schneider. Dec 80, 73p Rept no. AFIT/GEP/PH/80D-8

An investigation of electron loss processes in electron beam-sustained discharges of an atmospheric pressure gas mixture of 1/1.6/3, CO2/He/N2 in a closed-cycle flow loop was conducted. Steady-state analysis of the discharge current indicates that the discharge is dominated by electron-neutral attachment at rates of approximately 10 to the 6th power sec. minus 1 in the E/N range of 0.5-9 Townsend. Attempts to fit an analytic solution of the electron lifetime equation to the discharge current decay curves were inconclusive due to the slow fall-time of the electron gun relative to the current decay time. Changes in the discharge characteristics due to chemical reactions in the plasma were not significant. (Author)

AD-A094 456/1 PC **A04**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Plasma Theory and Simulation.
Quarter progress rept. no. 1, 1 Jan-31 Mar 80,
C. K. Birdsall. 31 Mar 80, 75p
Contracts N00014-77-C-0578, DE-AS03-76-SF-00034
Sponsored in part by Contract DE-AT03-76-ET-53064.

Our research group uses both theory and simulation as tools in order to increase the understanding of instabilities, heating, transport, and other phenomena in plasmas. We also work on the improvement of simulation, both theoretically and practically.

AD-A094 457/9 PC **A04**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Plasma Theory and Simulation.
Quarterly progress rept. no. 2, 1 Apr-30 Jun 80,
C. K. Birdsall. 30 Jun 80, 57p
Contracts N00014-77-C-0578, DE-AS03-76-SF-00034
Sponsored in part by Contract DE-AT03-76-ET-53064.

Plasma Theory and Simulation. Our research group uses both theory and simulation as tools in order to increase the understanding of instabilities, heating, transport, and other phenomena in plasmas. We also work on the improvement of simulation, both theoretically and practically. (Author)

AD-A094 458/7 PC **A02**/MF **A01**
California Univ., Berkeley. Electronics Research Lab.
Plasma Theory and Simulation.
Quarterly progress rept. no. 3, 1 Jul-30 Sep 80,
C. K. Birdsall. 30 Sep 80, 23p
Contracts N00014-77-C-0578, DE-AS03-76-SF-00034
Sponsored in part by Contract DE-AT03-76-ET-53064.

For abstract see AD-A094 456.

AD-A094 459/5 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.
Solitary Alfven Waveguide Structures in a Magnetized Plasma,
J. P. Sheerin, and R. S. B. Ong. 30 Jan 80, 7p
AFOSR-TR-81-0066
Grant AFOSR-80-0029
Pub. in Jnl. of Plasma Physics, v24 pt1 p157-162 1980.

No abstract available.

AD-A094 460/3 PC **A02**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Aerospace Engineering.
The Effect of Collisions on Wave-Breaking in a Cold Plasma,
A. Schmitt, and R. S. B. Ong. 15 Feb 80, 3p
AFOSR-TR-81-0067
Grant AFOSR-80-0029
Pub. in Applied Physics, v22 p333-334 1980.

No abstract available.

AD-A094 461/1 PC **A02**/MF **A01**
Boston Coll., Chestnut Hill, MA. Dept. of Physics.
Plasmon Dispersion for Strong Coupling,
P. Carini, G. Kalman, and K. I. Golden. 7 May 80, 5p AFOSR-TR-81-0068
Grant AFOSR-76-2960
Pub. in Physics Letters, v78A, n5, 6 p450-453, 1 Sep 80. Prepared in cooperation with Northeastern Univ., Boston, MA. Dept. of Electrical Engineering.

No abstract available.

AD-A094 535/2 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Stability Properties of Azimuthally Symmetric Perturbations in an Intense Electron Beam.
Memorandum rept.,
Han S. Uhm, and Martin Lampe. 3 Feb 81, 50p
Rept no. NRL-MR-4441
ARPA Order-3718

The Vlasov-Maxwell equations are used to investigate the stability of azimuthally symmetric perturbations (e.g., sausage and hollowing modes) of an electron ion beam immersed in a resistive plasma. The perturbed space charge and plasma current are treated self-consistently for any value of the plasma conductivity. A similar analysis of the hose instability is also carried out. The analysis is carried out for the 'loss-cone' distribution function in which all of the beam electrons have the same value of energy and the same value of axial canonical momentum. In the high conductivity regime, the system is shown to be strongly destabilized by a sufficiently large value of the fractional current neutralization.

AD-A094 562/6 PC **A02**/MF **A01**
Florida Univ., Gainesville. Coll. of Engineering.
Analytical Investigaglon of Two-Phase MHD Duct Flows. The Impinging Jet of Two-Phase Flows.
Final rept.
1978, 5p
Contract N00014-76-C-0410

We have completed a numerical scheme for approximating the free boundary of a two dimensional inviscid incompressible jet impinging perpendicularly upon a solid wall. A Gould plot shows good agreement with an exact analytical method described by Birkhoff and Zarantonello 1957. Our method has the advantage over the analytic procedure that it allows for more realistic physical hypotheses. An example of a situation to which our method could be extended is the axisymmetric jet, for which no exact solution is know. It should be emphasized, however, that our algorithm is an approximating scheme; questions as to the speed of convergence and relative merits over the finite elements scheme used by Sarpkaya and Hiriart as reported by Gallagher and Oden 1975 in connection with the axisymmetric jet remain to be investigated. Our work should be viewed as a first step towards developing a predictive model for the velocity and pressure distributions in the impinging jet of a two-phase medium. The complexities of this process require alternative approaches to those followed in the past. This search to new directions has been our primary objective. (Author)

AD-A094 564/2 PC **A03**/MF **A01**
Michigan Univ., Ann Arbor. Dept. of Nuclear Engineering.
Laser Diagnostics of Metallic Plasmas.
Final rept. 1 Nov 78-31 Oct 80,
David R. Bach, Don Kania, and James J. Duderstadt. Dec 80, 32p AFOSR-TR-81-0010
Grant AFOSR-79-0030

The major objectives of this research project were to study the X-ray emission and dynamical behavior of exploded aluminum wire plasmas when subjected to intense CO2 laser radiation. The laser system based on Lumonics 601 TEA laser was optimized to produce a diffraction limited spot size (diameter 125 microns) yielding a focused intensity of 10 to the 12th power w/sqcm. The principal X-ray diagnostics consisted of two foil measurements using filtered photomultiplier detectors. These measurements were augmented by a variety of electrical and optical diagnostics to determine the time evolution of the exploding wire and the effects of the laser irradiation. Interaction experiments were performed with a radial, one sided illumination at the plasma midplane. The data obtained in these experiments is discussed and analyzed in the report. (Author)

AD-A094 591/5 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Noise Power Spectra of the Inductively Coupled Plasma,
Gary L. Walden, James N. Bower, Seif Nikdel, David L. Bolton, and James D. Winefordner. 24 Oct 79, 14p AFOSR-TR-81-0046
Contract F44620-76-C-0005, Grant PHS-GM-11373-16
Pub. in Spectrochimica Acta, v35B p535-546 1980.

No abstract available.

NRL-MR-4330 PC **A03**/MF **A01**
Naval Research Lab., Washington, DC.
Propagation of Relativistic Electron Beams in Current-Carrying Plasma Channels.
D. P. Bacon, G. Cooperstein, I. M. Vitkovitsky, and S. A. Goldstein. 5 Sep 80, 29p
Contract AI01-76ET53020

Experimental results of propagating up to 400 kA of relativistic electron beams (approx. 1 MeV) over a distance of 64 cm in a tightly focused mode are reported. Efficient transport (> 80%) was observed when a channel of plasma containing enough current to confine the hot electrons was used. Theory of the flow includes return current effects, and is in good agreement with experimental results. The theory is used to predict limits of this technique. (ERA citation 06:004371)

PB81-857021 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Measurements. September, 1975-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 75-Dec 80.
Jan 81, 198p NERACEI NT2535
Sponsored by National Technical Information Service, Springfield, VA.

the citations in this bibliography cover properties, measurements and interpretations of plasma, quasi-quadrature interferometer for plasma density radial profile measurements, optical measurement of plasma thomson scattering measurement, plasma spectral measurement, measurements of plasma in a tokamak, and application of thermoanemometric sounding to measurement of plasma. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857534 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Measurements. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Jan 81, 173p NERACIAANT2535
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover measurements of plasma ion temperature and plasma width, drifts, coupling fluxes, and lines. The bibliography also includes citations on the comparison between theory and laser spectroscopic measurements of plasma, the magnetic field in a rotating plasma, the basic parameters of plasma, and solar plasma oscillations. (Contains 173 citations, fully indexed and including a table of contents.)

PB81-857542 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Jets. September, 1971-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 71-Dec 80.
Jan 81, 179p NERACEI NT2538
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover electron density in laser jets, instability of slowly spreading plasma jets, characteristics of the three phase AC plasma jet, structure of magnetic field in plasma jets, and determination of the thermal and gas-dynamic characteristics of a plasma jet. Optical studies of plasma jets, infrared spectroscopy of pulsed plasma jets, and controlled generation of submicron metallic particles in plasma jets are also included in this bibliography. (Contains 200 citations, fully indexed and including a table of contents.)

PB81-857559 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Jets. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Jan 81, 172p NERACIAANT2538
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover electron density in laser jets, instability of slowly spreading plasma jets, characteristics of the three phase AC plasma jet, structure of magnetic field in plasma jets, and determination of the thermal and gas-dynamic characteristics of a plasma jet. Optical studies of plasma jets, infrared spectroscopy of pulsed plasma jets, and controlled generation of submicron metallic particles in plasma jets are also included in this bibliography. (Contains 179 citations, fully indexed and including a table of contents.)

PB81-857567 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Guns. January, 1970-December, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 48p NERACEI NT2539
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover struture of the electron beam of a magnetically insulated coaxial plasma gun, barium rail gun for plasma injection, high-intensity carbon ion injector, acceleration of solid pellets using a plasma gun, controlled experiments with rocket-borne plasma guns, and analysis of self-pulsing operation of a plasma gun by circuit theory. Spraying of powders using plasma guns and the gun aspects of rotating plasmas are also included in this bibliography. (Contains 46 citations, fully indexed and including a table of contents.)

PB81-857575 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Plasma Guns. January, 1972-December, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for Jan 72-Dec 80.
Jan 81, 96p NERACIAANT2539
Sponsored by National Technical Information Service, Springfield, VA.

The citations in this bibliography cover structure of the electron beam of a magnetically insulated coaxial plasma gun, barium rail gun for plasma injection, acceleration of solid pellets using a plasma gun, controlled experiments with rocket-borne plasma guns, and analysis of self-pulsing operation of a plasma gun by circuit theory. Spraying of powders using plasma guns and the gun aspects of rotating plasmas are also included in this bibliography. (Contains 92 citations, fully indexed and including a table of contents.)

UCRL-15294 PC **A02**/MF **A01**
California Univ., Livermore. Lawrence Livermore Lab.
Use of Radiative Line Broadening by an Intense Laser Field as a Plasma Diagnostic.
L. Schlessinger, and J. Wright. Aug 80, 17p
Contract W-7405-ENG-48

In many laser fusion applications it would be of significant interest to have an independent measurement of the strength of the laser electric field at various positions in the plasma. In this report we show that in many cases of interest the line broadening caused by an intense laser field can provide such a measurement. For low-Z elements at moderate temperatures and for typical laser intensities and densities, the line broadening caused by the intense field is the dominant source of line width. In this situation the line width depends on the strength of the laser field at that position and the line profile is quite unique, having a characteristic and calculable dependence on the angle between the laser electric field and the direction of the radiated photon. These special properties should allow the lines of low-Z elements seeded at various positions in the plasma to be identified, their widths determined, and the value of the laser electric field at that position derived. (ERA citation 06:004372)

20J. Quantum Theory

IFVE-OTF-79-132 PC **A02**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Serpukhov. Inst. Fiziki Vysokikh Energii.
Collective Variable Method and Generalized Hamiltonian Formalism.
A. V. Shurgaya. 1979, 16p
In Russian.
U.S. Sales Only.

The method of collective coordinates is considered from the point of view of the generalized Hamiltonian Dirac theory. All the operations are presented on the example of interaction of a classical particle with a scalar field, which is invariant relative to an arbitrary group of continuous transformations. Some data of the group theory are given. The conservation laws following from the requirement of invariance are considered. The expression for S matrix has been obtained by means of integrals over trajectories in a phase space. (Atomindex citation 11:529316)

ITEF-72(1979) PC **A03**/MF **A01**
Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii SSSR, Moscow. Inst. Teoreticheskoi i Eksperimental'noi Fiziki.
Anharmonic Oscillator: Perturbation Theory, Quasiclassical Approximation, the Pade Method.
A. D. Dolgov, V. L. Eletskij, and V. S. Popov. 1979, 45p
In Russian.
U.S. Sales Only.

An effective method of calculating higher orders of the perturbation theory (PT) for an anharmonic oscillator with an arbitrary dimension D has been developed. The method is based on transition from the Schroedinger equation to the Riccati nonlinear equation and reduces determination of the coefficients epsilon/sub k/ for a level energy to recurrence relations with integers. The coefficients epsilon/sub k/ have been calculated precisely at k<=14 and with the arbitrary dimension D, and also calculated numerically at k<=70 and 1<=D<=10 (k is the order of PT). The following questions are considered as well: the rate of yield of epsilon/sub k/ onto the asymptotics at k implies infinity, quasiclassical approximation, energy expansion E(g,D) in degrees of D and D exp -1 , summation of the PT series by the Pade approximation method. The method proposed of calculating higher orders of PT may be also applied to other problems of quantum mechanics (Stark effect in a hydrogen atom, determination of bound states in the Yukawa and Hulthen potentials, and so on). (Atomindex citation 11:529232)

JINR-E-2-12731 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Evolution Equations, Solvable Through the Inverse Scattering Method. 1. Spectral Theory.
V. S. Gerdjikov, and E. Kh. Khristov. 1979, 20p
U.S. Sales Only.

Some problems are considered of the spectral theory of the integro-differential operators, generating nonlinear evolution equations solvable through the inverse scattering problem. The main notations are estimated. The Green function of the operator lambda /sub +/ is defined and the operator calculus for lambda /sub +/ is constructed. A Lagrangian plane is introduced in the space of 2-component vector-functions, on which the operator L/sub +/ is symmetric with respect to the skew-scalar product. (Atomindex citation 11:529249)

JINR-R-4-12774 PC **A02**/MF **A01**
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation.
Wave Equations for the Tensor of Angular Momentum.
R. M. Yamaleev. 1979, 12p
In Russian.
U.S. Sales Only.

Analogy between momentum and angular momentum existing in the frame of Newton's equation is generalized for the case of the Hamilton-Jacobi

theory. The equations for the vector function presenting vector analog of the Hamilton-Jacobi equation are obtained. In the framework of quantum mechanics the wave equations for the tensor of angular momentum were derived. The case of relativistic mechanics has been considered. (Atomindex citation 11:529335)

20K. Solid Mechanics

AD-A094 028/8 PC **A02**/MF **A01**
Stanford Univ., CA.
The Basis for an Elastic-Plastic Code,
E. H. Lee. May 76, 23p
Contract N00014-75-C-0923

A complete stress-analysis of a metal-forming process is necessary in order to assess the onset of metal-forming defects such as the initiation of internal or surface cracks or the generation of residual stresses, and this demands elastic-plastic analysis. This report comprises comments on the plasticity theory formulation needed for a finite-element computer code designed for the analysis of metal forming processes. J. R. Rice has pointed out the importance of convection and rotation terms in the definition of stress-rate for inclusion in elastic-plastic constitutive relations, and that the development of uniqueness and stability analysis by R. Hill provides a convenient vehicle for including these effects. The development of these concepts is described and how they generate a convenient variational principle to form the basis of an elastic-plastic code to analyze metal forming. (Author)

AD-A094 153/4 PC **A11**/MF **A01**
Illinois Univ. at Urbana-Champaign. Dept. of Civil Engineering.
A Stress Analysis of Circular Cylindrical Shell Intersections, Including the Influences of Reinforcement, Cyclic Plasticity and Fatigue.
Doctoral thesis,
D. P. Rajkotia, and W. C. Schnobrich. Dec 80, 239p Rept nos. SRS-483, UILU-ENG-80-2023
Contract N00014-75-C-0164

The intersection of cylinders is an unavoidable element in many engineering installations such as nozzle to cylinder connections in nuclear reactors or pressure vessels, pipe intersections in offshore platforms etc. The region of intersection presents a sharp geometric discontinuity in the structure which produces a stress field with very high stress concentration. A unified in depth study of the behavior of cylinder intersections is presented in this document. This study consists of numerical evaluations of the stress fields in the vicinity of the cylindrical shell intersections. Included in the study are variations of reinforcement configurations around the curve of intersection, variations of nozzle to cylinder diameter ratios, variations of angles of intersection, and cyclic plasticity. The finite element method is employed for this stress analysis. An algorithm is developed for an automated mesh generation covering the region of the cylinder intersection. A kinematic strain hardening material model is formulated for application to cases with cyclic plasticity. The results of the nonlinear analysis are incorporated with existing numerical techniques to predict the fatigue life of the components involved. (Author)

AD-A094 432/2 PC **A07**/MF **A01**
Utah Univ., Salt Lake City.
Three Dimensional Stress Fields in Cracked Plates.
Final scientific rept.,
E. S. Folias. Nov 80, 147p AFOSR-TR-81-0017
Contract F49620-77-C-0053

A theoretical investigation was made for the determination of the three dimensional stress field of a cracked plate, of an arbitrary thickness, 2h, and subjected to a uniform external load of mode I. The displacement and stress fields are expressed in terms of the displacement V projected onto the plane containing the crack. In addition the question of uniqueness is examined for a whole class of these three-dimensional crack problems. It is found that solutions to such problems in elastostatics are unique, provided they satisfy the condition of local finite energy everywhere. Finally, it is shown that the solution is complete and it appears that at the corner, where the crack front meets the free surface of the plate, the solution is not separable either in spherical or cylindrical coordinates. (Author)

AD-A094 510/5 PC **A02**/MF **A01**
Boeing Aerospace Co., Seattle, WA.
Program for Nonlinear Structural Analysis.
Interim technical progress rept. Apr 79-Jun 80,
R. E. Jones. Jun 80, 7p AFOSR-TR-81-0019
Contract F49620-79-C-0057

A finite element computer code is under development which is specialized to strong nonlinearities of the geometrical type. The work includes beam and shell elements, and makes use of three important technical features to best address the nonlinear problem. These are: (1) the use of higher degree functions for the membrane or axial displacements than for the bending displacements; (2) the use of the static perturbation method; and (3) the use of Euler angles to represent rotations. Computed results illustrate the methods and computer codes developed. (Author)

AD-A094 560/0 PC **A02**/MF **A01**
South Carolina Univ., Columbia. Dept. of Mathematics and Computer Science.
A Lower Bound for the Norm of the Solution of a Nonlinear Volterra Equation in One-Dimensional Viscoelasticity.
Interim rept.,
Frederick Bloom. 9 Dec 80, 25p AFOSR-TR-81-0055
Grant AFOSR-77-3396
Prepared in cooperation with Minnesota Univ., Minneapolis. School of Mathematics.

It is shown that the lower bound for the norm of sufficiently smooth solutions of initial history value problems associated with the nonlinear, one-dimenstional model of viscoelastic response must grow quadratically in time on any interval where the norm of U is bounded from above. No sign definiteness restrictions are imposed on the derivatives on this model of nonlinear viscoelastic response.

AD-A950 141/2 MF **A01**
David Taylor Model Basin, Washington, DC.
An Experimental Investigation of Effect of End Conditions on Strength of Stiffened Cylindrical Shells,
Robert F. Keefe, and James A. Overby. Dec 59, 28p Rept no. DTMB-1326
Availability: Microfiche copies only.

No abstract available.

20L. Solid-State Physics

AD-A094 041/1 PC **A02**/MF **A01**
Wisconsin Univ.-Milwaukee. Dept. of Physics.
Effect of Lattice Distortion on Electron-Impurity Scattering: Phase Shifts in the Distorted-Wave Born Approximation.
Rept. for 1 Jan-31 Dec 79,
R. S. Sorbello. 9 Oct 79, 9p AFOSR-TR-80-1276
Grant AFOSR-76-3082
Pub. in Physica Status Solidi, v100(b) p347-354 1980.

No abstract available.

AD-A094 042/9 PC **A02**/MF **A01**
Xerox Palo Alto Research Center, CA.
Annual Conference on the Physics of Compound Semiconductor Interfaces (6th) Held at Pacific Grove, California on 30 January-2 February 1979,
Robert S. Bauer. 1979, 16p
Contract N00014-78-C-0728

Funds were used to support the Sixth Annual Conference on the Physics of Compound Semiconductor Interfaces which was held at a self-contained Conference Center located at the Asilomar State Beach on the Monterey California Peninsula. This year particular emphasis was given to the fundamental inter-relationships between electronic, crystallographic, chemical, and metallurgical properties and growth and defect structures at semiconductor surfaces and interfaces.

AD-A094 075/9 PC **A05**/MF **A01**
Massachusetts Inst. of Tech., Lexington. Lincoln Lab.
Solid State Research, 1980:3.
Quarterly technical summary rept. 1 May-31 Jul 80,
Alan L. McWhorter. 15 Aug 80, 77p ESD-TR-80-151
Contract F19628-80-C-0002

This report covers in detail the solid state research work of the Solid State Division at Lincoln Laboratory for the period 1 May through 31 July 1980. The topics covered are Solid State Device Research, Quantum Electronics, Materials Research, Microelectronics, and Analog Device Technology.

AD-A094 080/9 PC **A04**/MF **A01**
Erlangen-Nuernberg Univ. (Germany, F.R.). Fachbereich Naturwissenschaft.
Optical Excitation of MOS Interface States.
Final technical rept. Sep 79-May 80,
M. Schulz, and K. Blumenstock. Oct 80, 51p
Contract DAJA37-79-C-0547

MOS interface states have been studied in n-type samples by infrared optical excitation. Infrared light in the wavelength range 5 to 15 micrometers was used to excite only shallow states near the conduction band edge. Thermal background radiation was excluded in the irradiation by using cold interference filters for the spectral selection. For a sample with low density of states approx. 10 to the 10th power/sq cm ev, a consistent density was observed in the optical measurement with quasistatic measurements and CC-DLTS. The optical absorption cross-section sigma assumes low values which are in favor for a model which interprets interface states by tunneling into a discrete level in SiO2. Another sample with a high density of states shows a complicated behavior with a field dependence and inconsistency of the density of states observed by different techniques which cannot be completely interpreted. The absorption cross-section, however, also assumes low values below 10 to the -18th power sq cm.

AD-A094 110/4 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Electric and Magnetic Anomalies at the Charge-Density-Wave Transition in Niobium-Substituted Vanadium Diselenides,
Lynn F. Schneemeyer, and M. J. Sienko. 12 Oct 79, 8p AFOSR-TR-80-1233
Grant AFOSR-80-0009
Pub. in Jnl. of Physics and Chemistry of Solids, v41 n9 p929-933 1980.

No abstract available.

AD-A094 113/8 PC **A02**/MF **A01**
Cornell Univ., Ithaca, NY. Baker Lab.
Relationship Between Superconductivity, Magnetic Susceptibility, and Crystal Structure in the Pseudobinary System Lead Molybdenum (Sulfide-Selenide),
Frank S. Delk, II , and M. J. Sienko. 9 Oct 79, 7p AFOSR-TR-80-1236
Grant AFOSR-80-0009
Pub. in Inorganic Chemistry, v19 n5 p1352-1356 1980.

No abstract available.

AD-A094 276/3 PC **A06**/MF **A01**
Illinois Univ. at Chicago Circle. Dept. of Physics.
Topographic Examination of Semiconductor Systems.
Final technical rept. 1 Jun 78-30 Jul 80,
S. Sundaram, and P. M. Raccah. Nov 80, 116p
Contract N00014-79-C-0809

Using the techniques of modulation spectroscopy, a systematic investigation and characterization of Gallium Arsenide, Indium Phosphide, and quaternary alloys of InGaAsP have been completed. The effective tool for the topographic examination of

implanted materials is the electrolyte electroreflectance (EER) method. The spatial distribution of carrier concentration, the effects of etching, implantation and anneal procedures on the transition energies have been studied. Besides providing the needed 'feedback' information for the materials growth technology program at NRL, the modulation EER technique is shown to be a very unique and sensitive method for the optical characterization of the III-V semiconductors and their alloys. (Author)

AD-A094 282/1 PC **A02/MF A01**
Wisconsin Univ.-Madison. Dept. of Metallurgical and Mineral Engineering.
Site-Specific Densities of States for Cleaved and Sputtered GaAs (110) from Auger Line Shapes.
Technical rept.,
G. D. Davis, D. E. Savage, and M. G. Lagally. 15 Sep 80, 9p Rept no. TR-3
Contract N00014-77-C-0474

The nature and extent of interfacial chemical reactions are major factors affecting the electronic properties of semiconductor-metal or semiconductor-semiconductor interfaces. There reactions and the resulting chemical phases may depend strongly on the surface structure and the extent and nature of structural defects. A first step to understanding defect-related chemical phase formation and interfaces is to correlate local chemical properties with structural defects. We have made an initial attempt to do this for GaAs (110) by comparing the results of several techniques. We have examined the cleaved and sputtered GaAs (110) surface with x-ray photoemission spectroscopy (XPS), Auger electron spectroscopy (AES) line shape analysis, low-energy electron diffraction (LEED), and scanning electron microscopy (SEM). In the Auger process, because the initial core hole is localized around one atom, the probability of exciting a valence electron in a core-core-valence transition falls off quite rapidly away from the core. Consequently, the charge distribution that is probed by such transitions is site-specific and may differ if the initial core hole is made on the anion or the cation. This is in contrast to a photoemission measurement, where sites widely separated in R may contribute to the photoelectron intensity at a particular value of energy.

AD-A094 396/9 PC **A05/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Multipulse Laser Annealing of Selenium Implanted GaAs.
Master's thesis,
Ricardo Antonio Contreras. Dec 80, 89p Rept no. AFIT/GEO/PH/80D-5

GaAs implanted with 120 keV Se at a fluence of 10 to the 14th power ions/sq cm was laser annealed using .53 micrometers energy from a Q-switched, frequency doubled, Neodymium:YAG laser. The substrates were irradiated in air by either a single pulse or multipulse with an average energy density of 300 mj/sq cm per pulse. The pulse width (FWHM) was 15 ns. Optical reflectivity in the ultraviolet spectrum of 210 nm to 380 nm was used to evaluate the crystal-line structure. The relative crystalline damage versus depth profile was obtained and compared to that of an as-implanted sample. The depth profiling was accomplished using a chemical etch. Implanted samples annealed at 1, 2, 4, 8, and 12 pulses all showed a dramatic reduction of damage as compared to the as-implanted sample. However, the results of the two pulse anneal show the highest degree of recrystallization approaching that of a virgin sample. (Author)

AD-A094 402/5 PC **A05/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Measurement of the Minority Carrier Diffusion Rate in N-GaAs.
Master's thesis,
Gary Alan Bleeker. Dec 80, 98p Rept no. AFIT/GEO/PH/80-4

A new experimental procedure was developed to directly measure the minority carrier diffusion rate in n-GaAs. A Q-switched Nd-YAG laser was used to excite the sample and the delay between laser excitation and subsequent luminescence of the sample was used to determine the diffusion rate. A mathematical model of carrier diffusion was developed and computer plots generated to predict and analyze the experimental data. With the 4 micron thick sample used, the procedure enabled the researcher to obtain an upper bound in delay time of 350 picoseconds and an approximate diffusion coefficient of 100 sq cm/sec. The spectral components of the luminescence and relative conversion were studied. The luminescent spectra exhibited yet unidentified lines above the band gap energy in addition to the usual set of excitation lines. The conversion efficiency of the laser excitation to photoluminescence was 0.14%. (Author)

AD-A094 403/3 PC **A06/MF A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Photoluminescence Study of Laser Interaction with GaAs.
Master's thesis,
James Melvin Heitman. Dec 80, 115p Rept no. AFIT/GEO/PH/80-6

A study was made on the effect of scanned CW laser radiation on the photoluminescence of virgin, VPE and ion-implanted GaAs. The samples were scanned at room temperature using an argon laser with a beam spot size of 25 microns and a beam dwell time of 1 msec. A flowing cover gas was found to be essential during scanning for beam powers near the damage threshold. The damage threshold was primarily a function of laser power and spot size; dwell time was of secondary importance. Photoluminescence data was taken at 5 deg K using argon laser excitation. Spectra from virgin samples scanned below the damage threshold was similar to that from unscanned samples. For VPE samples implanted at room temperature with Ge at a fluence of 1 times 10 to the 14 per cubic centimeter, approximately 5% of virgin material luminescence was recovered after laser annealing of both capped and uncapped samples. This is approximately the same percentage achieved after thermal annealing. However, no sign of Ge activation was seen in the laser annealed samples, even though activation was achieved using thermal annealing. Ellipsometry measurements showed that the laser annealed samples had the same index of refraction as found in unimplanted material. (Author)

AD-A094 412/4 PC **A04/MF A01**
Rockwell International, Thousand Oaks, CA. Electronics Research Center.
Capless Annealing of Ion Implanted GaA.
Final rept. 1 Sep 78-31 Aug 80,
D. P. Siu, and A. A. Immorlica, Jr. Dec 80, 56p
ERC41013.3FR, AFOSR-TR-81-0035
Contract F49620-78-C-0111

A capless powder annealing technique (PAT) is described and is shown to enable reproducible annealing of ion implanted GaAs without the need of a protective cap. This method employs finely powdered graphite as the annealing medium with a layer of finely crushed GaAs beneath it proving an As-rich environment which prevents the GaAs substrate from decomposing at typical annealing temperatures of 850 C. Using rf spark-source mass spectrometry, an As concentration in excess of the equilibrium value of As over GaAs at the annealing temperature is found in the post-process powder. The crushed GaAs layer is essential in providing this high As concentration.

AD-A094 462/9 PC **A02/MF A01**
Northwestern Univ., Evanston, IL. Dept. of Physics and Astronomy.
Electronic Structure and Magnetism of CuNi Coherent Modulated Structures.
T. Jarlborg, and A. J. Freeman. 9 Apr 80, 5p
AFOSR-TR-81-0069
Grant AFOSR-76-2948
Pub. in Physical Review Leters, v45 n8, 653-656, 25 Aug 80.

No abstract available.

AD-A094 464/5 PC **A02/MF A01**
Northwestern Univ., Evanston, IL. Dept. of Physics and Astronomy.
Magnetism and Superconductivity in C15 Compounds from Self-Consistent Band Calculations,
T. Jarlborg, and A. J. Freeman. 20 Jul 79, 12p
AFOSR-TR-81-0071
Grants AFOSR-76-2948, NSF-DMR77-23776
Pub. in Physical Review B, v22 n5 p2332-2342, 1 Sep 80.

No abstract available.

AD-A094 507/1 PC **A02/MF A01**
Northwestern Univ., Evanston, IL. Dept. of Physics and Astronomy.
Self-Consistent Linearized Augmented-Plane-Wave Study of the Electronic Structure and Super-Conductivity of FCC Lanthanum under Pressure,
Warren E. Pickett, A. J. Freeman, and D. D. Koelling. 16 Oct 79, 22p AFOSR-TR-81-0072
Grant AFOSR-76-2948
Pub. in Physical Review B, v22 n6 p2695-2715, 15 Sep 80.

No abstract available.

AD-A094 540/2 PC **A03/MF A01**
California Univ., Berkeley. Electronics Research Lab.
Research in the Development of Thin-Film Devices and in the Study of Device Physics for Optical Communications and Optical Electronics.
Final rept. 15 Nov 73-14 Nov 79,
S. Wang. 1979, 27p ARO-11833.34-EL, ARO-14621.23-EL
Grants DAHC04-74-G-0070, DAAG29-77-G-0053
Supersedes report dated 1979, AD-A082 632.

Our research effort is reviewed in four basic areas: (1) experimenting with new laser structures for providing two-dimensional waveguiding to control lateral modes, (2) investigating suitable waveguiding structures for use as the building block for future monolithic integration of optical components based on GaAs technology, (3) developing technologies related to material aspects for GaAs and related semiconductors, such as oxide formation and LPE growth of quaternary compounds, and (4) studying and demonstrating the use of Ti-diffused LiNb03 waveguides in integrated-optics applications as modulators and power dividers. Using LPE growth over chemically etched channels we have developed new lasers with two-dimensional waveguides to stabilize the lateral modes. These lasers show linear light versus current relation, stable radiation pattern, and single mode operation up to 2 Jth capable of delivering 70 mW power. Using a waveguide structure containing a large optical cavity (LOC), we have been able to integrate a DBR laser with a detector and with a modulator. The LOC scheme enables us to remove the GaAs layer from the passive regions, which in turn makes possible the attainment of high differential quantum efficienty in the DBR laser and also the use of the same structure as the building blocks for monolithic integration. The fabrication requires only a one-step LPE growth. As a preparation for future work, preliminary experiments on anodic oxidation of GaAs, high temperature effects in LPE layers grown on GaAs wafers, and LPE growth of (Galn) (AsP) layers have been initiated to gain experience and insight as to the problems involved.

AD-A094 601/2 PC **A04/MF A01**
Westinghouse Research and Development Center, Pittsburgh, PA.
Indium Phosphide for High Frequency Power Transistors.
Final rept. 22 Mar 79-28 Apr 80,
V. L. Wrick, W. J. Choyke, and R. C. Clarke. 28 Sep 80, 65p Rept no. 243-023-T1
Contract N00014-78-C-0254, DARPA Order-3535

This report covers the conclusion of studies aimed at determining the utility of InP for fabricating power microwave field effect transistors (FET's). This phase of the work provided working transistors which were modeled and compared to their GaAs counterparts. Vapor phase epitaxy (VPE) results are provided for device structures which include high resistivity buffer layers. Ion implantation was aimed at a novel amorphization and low temperature regrowth study to provide implanted p-n junctions in InP for future JFET structures. Proc-

essing technology concentrated on a self-aligned diffused gate JFET structure. This technique produced working microwave transistors (JFET) up to 1200 micrometer in gate periphery. The report compares these devices to similar GaAs transistors (MESFET) and makes recommendations for future studies. (Author)

BNL-28419 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Neutron Studies of the Magnetic Phase Transition in UAs.
S. M. Shapiro, S. K. Sinha, G. H. Lander, and O. Vogt. 1980, 6p CONF-801134-3
Contract AC02-76CH00016
26. annual conference on magnetism and magnetic metals, Dallas, TX, USA, 11 Nov 1980.

Uranium arsenide undergoes a first order phase transition to a type I antiferromagnetic (AF-I) structure at T/sub N/ approx. equal to 124 K. Above T/sub N/, UAs exhibits strongly anisotropic critical scattering suggestive of pseudo two-dimensional behavior. The temperature dependence suggests a tendency to order with an incommensurate wave vector but then suddenly orders with the AF-I structure. A mean-field theory is propoced based on an anisotropic Hamiltonian and provides a reasonable description of the results. (ERA citation 06:003913)

BNL-28449 PC A02/MF A01
Brookhaven National Lab., Upton, NY.
Study of the Temperature Dependence of Spin-Wave Excitations in Fe/sub X/Cr/sub 1-X/.
S. M. Shapiro, C. R. Fincher, Jr., A. H. Palumbo, and R. D. Parks. 1980, 9p CONF-801134-2
Contract AC02-76CH00016
26. annual conference on magnetism and magnetic metals, Dallas, TX, USA, 11 Nov 1980.

Certain alloys of Fe/sub x/Cr/sub 1-x/ ($0.18 < x < 0.30$) have been reported to undergo a transition from a ferromagnetic state to one exhibiting mictomagnetic or spin-glass behavior at temperatures below the Curie temperature, T/sub c/. Studies of the critical scattering on polycrystalline samples show a peak at T/sub c/ for all x's and a monotonically decreasing intensity for $T < T/sub c/$ for $x > 0.30$. For those x's exhibiting spin-glass behavior, there is an increase in intensity at low temperatures. The dynamical studies reveal well-defined spin waves within the ferromagnetic regime but as T approaches the spin-glass phase, the magnetic stiffness decreases dramatically. (ERA citation 06:003914)

CONF-801111-17 PC A02/MF A01
Oak Ridge National Lab., TN.
Laser Annealing of Ion Implanted Silicon.
C. W. White, B. R. Appleton, and S. R. Wilson. 1980, 11p
Contract W-7405-ENG-26
Conference on application of accelerators in research and industry, Denton, TX, USA, Nov 1980.

Pulsed laser annealing of ion implanted silicon leads to the formation of supersaturated alloys by nonequilibrium crystal growth processes at the interface occurring during liquid phase epitaxial regrowth. The interfacial distribution coefficients from the melt (k') and the maximum substitutional solubilities (C/sub s//sup max/) are far greater than equilibrium values. Both K' and C/sub s//sup max/ are functions of growth velocity. Mechanisms limiting substitutional solubilities are discussed. 5 figures, 2 tables. (ERA citation 06:003943)

INIS-mf-5731 PC A02/MF A01
Atomic Energy of Canada Ltd., Chalk River (Ontario). Chalk River Nuclear Labs.
Interesting Results from Neutron-Scattering.
A. D. B. Woods. 10p CONF-7906178-2
Canadian Association of Physicists annual congress, Vancouver, Canada, 18 Jun 1979.
U.S. Sales Only.

Neutron scattering has been a useful tool in the determination of the lattice dynamics of metals, studies of the physics of magnetism in rare-earth systems, observing changes in the structure of DNA bases after ultraviolet irradiation, looking at plastic crystals, following structural phase changes in ferroelectric materials, and studying liquid He. Both low- and high-flux facilities are useful. (Atomindex citation 11:530163)

INIS-mf-5752 PC A07/MF A01
Katholieke Univ. Nijmegen (Netherlands).
Projective Unitary-Antiunitary Representations of the Shubnikov Space Groups.
P. M. van den Broek. 1979, 138p
Thesis.
U.S. Sales Only.

Some mathematical aspects of the symmetry of a physical system in quantum mechanics are examined with special emphasis on the symmetry groups of charged particles in crystalline solids, the Shuknikov space groups. (Atomindex citation 11:529215)

INIS-mf-5760 PC A07/MF A01
Katholieke Univ. Nijmegen (Netherlands).
Millimetre and Submillimetre Wave Spectroscopy of Solids.
C. G. C. M. de Kort. 1979, 133p
Thesis.
U.S. Sales Only.

The author describes and discusses experiments on the far infrared properties of two different solids at low temperature: MgO crystals doped with chromium, and mercury films. (Atomindex citation 11:529501)

INIS-mf-5761 PC A07/MF A01
Katholieke Univ. Nijmegen (Netherlands).
Submillimetre Wave Spectroscopy of Semiconductors in High Magnetic Fields.
J. C. Maan. 1979, 137p
Thesis.
U.S. Sales Only.

Two types of cyclotron resonance studies with far infrared radiation and at high magnetic fields in semiconductors are discussed. First, the phenomenon of the change in the static conductivity at cyclotron resonance conditions in pure semiconductors, in this case n-GaAs, is investigated. Secondly, the results of cyclotron resonance experiments in an n-InAs-GaSb superlattice are discussed. (Atomindex citation 11:529507)

PB81-134611 Not available NTIS
National Bureau of Standards, Washington, DC.
Mean Free Paths of Very-Low-Energy Electrons; the Effects of Exchange and Correlation,
David R. Penn. Sep 80, 6p
Pub. in Physical Review B 22, n6 p2677-2682, 15 Sep 80.

The mean free path of low-energy electrons in a free-electron-like material are calculated using a screened electron-electron interaction which is antisymmetrized for the case of parallel-spin electrons. Calculations are carried out for several different approximations of the screening function: Fermi-Thomas, Lindhard, Singwi, and Kukkonen-Overhauser. The first three yield mean free paths that agree to within 10%, while the Kukkonen-Overhauser screening yields mean free paths that are roughly half those given by the other approximations. The effect of the Pauli principal in all cases is that the scattering between anti-parallel-spin electrons is roughly three to ten times stronger than between parallel-spin electrons.

PB81-139628
(Order as PB81-139479, PC A04/MF A01)
Office of Naval Research, London (England).
Solid State Physics at Imperial College, London,
J. R. Neighbours, and F. E. Saalfeld. 30 Jun 80, 2p
Included in European Scientific Notes, v34 n6 p303-304, 30 Jun 80.

Topics considered include magnetic alloys, dilute alloys, spin glasses, onset of long-range magnetic order, concentrated iron alloys, pressure effects in magnetism, and binary rare-earth alloys. Also discussed is recent work with a new amorphous/crystalline silicon compound, Na(x)Si(136).

PB81-144297 Not available NTIS
National Bureau of Standards, Washington, DC.
Evidence for Reconstructed (001) Tungsten Obtained by Field-Ion Microscopy,
A. J. Melmed, R. T. Tung, W. R. Graham, and G. D. W. Smith. Nov 79, 4p
Pub. in Physical Review Letters 43, n20 p1521-1524, 12 Nov 79.

New results have been obtained, by field-ion microscopy, relating to the atomic structure of clean (001) W. The evidence supports a reconstruction model with periodic displacements of atoms having vertical components. The reconstructed atomic configuration prevails over the entire temperature range of this investigation (about 15-460 K), suggesting that no phase transition may be needed to account for the structural features of (001) W.

PB81-149379 Not available NTIS
National Bureau of Standards, Washington, DC.
Thermal Expansion of Single Crystal Sapphire from 293 to 2000 K - Standard Reference Material 732,
Thomas A. Hahn. Aug 77, 11p
Pub. in International Symposium on Thermal Expansion, Hecla Island, Manitoba, Canada, August 29-31, 1977, n6 11p.

This single crystal sapphire rod is the fourth Standard Reference Material (SRM) to be certified for thermal expansion by the National Bureau of Standards. Expansion measurements to 1000 K on three samples indicate that the stock of material is of consistant quality suitable for certification. In the temperature range from 293 to 1000 K measurements were made using an interferometer apparatus. Above 1000 K length measurements were made using twin telemicroscope with the sample heated in a tungsten mesh furnace. Measurements were made parallel to the rod axis which is oriented 59 degrees from the c-axis of the crystal. Smoothed values of the expansion and coefficients of expansion were obtained by fitting the expansion with a variation of Gruneisen's equation. Final values of the four parameters were obtained by minimizing the standard deviation in a least-squares analysis. The results of this study are generally in good agreement with expansion values found in the literature. A comparison of the results of this study with data found in the literature will be presented.

PB81-149502 PC A10/MF A01
Department of Energy, Washington, DC.
Ukrainian Physics Journal,
V. E. Lashkarev. c1980, 205p TT-74-52000/06
Trans. of Ukrainskii Fizicheskii Zhurnal (USSR) v17 n6 Jun 76, by S. K. Paranyape, and S. K. Khanna. See also Volume 17, Number 5, PB81-119794. Sponsored in part by National Science Foundation, Washington, DC. Special Foreign Currency Science Information Program.

Contents:Mitrofan Vasil'evich Pasechnik (on his sixtieth birthday); Plasma echo in semiconductors; A phenomenological model of electron-phonon interaction and criterion for superconductivity of metals; Form factors of electr oexcitation of baryon resonances in nucleons; Real parts of photoproduction of neutral vector mesons by nucleons and gamma-quanta scattering by nucleons as predicted by the quark model; Neutrino-lepton interaction and intermediate vector boson; Polarization interaction of flowing plasma in transverse magnetic field; Verification of Butler-Pearson model on photonuclear reactions with E(gamma max) = 1140 MeV; Calculation of annihilation rate of interstitials and vacancies; Space correlation study of laser radiation by photon coincidence method; Temperature dependence of field emission of p-type silicon with doping; Some photoelectric properties of CdSb stipulated by anisotropy in electric conductivity; High-frequency conductivity of high density electrons; Study of 12C(d,p0)13C and 12C(d,p1)13C* reactions by polarized deuterons; Absorption of extraordinary wave at oblique incidence in a weak homogeneous plasma around hybrid resonance; Angular momentum coherent states; Equilibrium state and spin wave spectrum of crystals and a helical magnetic structure in the external magnetic field; Dynamics of Dirac electron in electromagnetic and uniform magnetic fields; Kinetic theory of linewidth of laser emission in spec-

trally heterogeneous system; Nuclear reaction mechanisms; Brief communications.

PB81-802316 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Ion Implantation. 1973-November, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1973-Nov 80.
Dec 80, 71p
Supersedes PB80-803885. Sponsored by National Technical Information Service, Springfield, VA.

This bibliography of citations to the international literature concerns ion implantation methods for introducing impurities into the surface layer of a solid, particularly as applied to semiconductor devices such as field-effect transistors and solar cells. Specific topics include equipment, techniques, semiconductor doping, and radiation effects on material properties. (This updated bibliography contains 309 citations, 76 of which are new entries to the previous edition.)

PB81-802605 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Josephson Junctions. 1964-1980 (Citations from the NTIS Data Base).
Rept. for 1964-80.
Jan 81, 280p
Supersedes PB80-802655, and NTIS/PS-78/1047.

The cited reports of Federally-funded research discuss the theory, design, fabrication, performance, and applications of Josephson junctions. References to such applications as far infrared radiation detectors, microwave detectors, voltage standards, noise thermometry, and magnetometry are included. (This updated bibliography contains 276 citations, 39 of which are new entries to the previous edition.)

PB81-802613 PC **N01**/MF **N01**
National Technical Information Service, Springfield, VA.
Josephson Junctions. September, 1978-1980 (Citations from the Engineering Index Data Base).
Rept. for Sep 78-1980.
Jan 81, 285p
Supersedes PB80-802671, and NTIS/PS-78/1048. See also 1970-1974, NTIS/PS-76/0745, and 1975-August, 1978, PB80-802663.

The cited reports of worldwide research discuss theory, design, fabrication, performance, and applications of Josephson junctions. References to such applications as logic circuits, shift registers, data storage devices, far infrared detectors, microwave detectors, voltage standards, noise thermometry, and magnetometry are included. (This updated bibliography contains 280 citations, 120 of which are new entries to the previous edition.)

PB81-857658 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Brillouin Effect. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 157p NERACSPNNT2762
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning theoretical, experimental, and observational considerations of the Brillouin effect on electromagnetic radiation in various media ranging from solids to plasmas. Various types of brillouin scattering are included, along with the effects of temperature and media compositions on the Brillouin effect. (Contains 152 citations, fully indexed and including a table of contents.)

PB81-857740 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Band Theory for Semiconductors. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 96p NERACSPNNT2900
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning band theory in relationship to the electronic structure, binding energies, and properties of semiconductors. Theoretical, experimental, and observational information concerning the band structure of semiconductors are considered. (Contains 77 citations, fully indexed and including a table of contents.)

PB81-857757 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Band Theory for Superconductors. January, 1970-December, 1980 (Citations from the Searchable Physics Information Notices Data Base).
Rept. for Jan 70-Dec 80.
Jan 81, 73p NERACSPNNT2901
Sponsored by National Technical Information Service, Springfield, VA.

This retrospective bibliography contains citations concerning band theory in relationship to the electronic structure, energy-level density, and the electrical and magnetic properties of various types of superconductors or superconducting materials. Transition temperature and tunnel effect for superconductors in general and for specific superconductors are considered. (Contains 63 citations, fully indexed and including a table of contents.)

20M. Thermodynamics

AD-A094 401/7 PC **A07**/MF **A01**
Air Force Inst. of Tech., Wright-Patterson AFB, OH. School of Engineering.
Investigation of Laser Heating in Components with Sharp Edges.
Master's thesis,
James F. Berke. Dec 80, 129p Rept no. AFIT/GEO/PH/80-3

Numerical results are presented for the approximate time-averaged power density dissipated on the surface of a highly conductive infinite wedge (of angle 90 deg) near the vicinity of the sharp edge. The numerical results are normalized so one may readily obtain results for varying incident wave frequencies. The angle of incidence of the incident radiation, Theta sub i (measured with respect to the surface normal of the wedge), is varied from 0 deg (normal incidence) to 90 deg (grazing incidence). In particular, numerical results for TE and TM polarization are presented for incident wavelengths of 3.8 and 10.6 micrometers. It is assumed that the power density absorbed (watts/sq m.) is all converted to heat density. To accept the validity of the results, an extensive check is made on an arbitrary (real) order Bessel function subroutine used in the equation necessary for the numerical calculations. General electromagnetic theory is also discussed and extended to the use in specific geometries. The geometries considered besides the wedge (though with no numerical results) are the parabolic cylinder and infinite cone. In conclusion, the numerical results seem very promising due to the success of verifying the Bessel function subroutine used in the calculations. (Author)

20N. Wave Propagation

AD-A094 102/1 PC **A05**/MF **A01**
Rome Air Development Center, Griffiss AFB, NY.
VLF/LF Reflectivity of the Polar Ionosphere.
Rept. for 2 Sep-22 Dec 79.
Robert P. Pagliarulo, John P. Turtle, John E. Rasmussen, and Wayne I. Klemetti. Jun 80, 78p Rept no. RADC-TR-80-189

This report provides a summary of high latitude ionospheric reflectivity as observed by the USAF high resolution VLF/LF ionosounder operating in northern Greenland. Ionospheric reflectivity parameters, including reflection heights and coefficients, are presented as a function of time of day. Riometer and magnetometer measurements of the polar propagation environment are presented as supplementary data. (Author)

AD-A094 134/4 PC **A03**/MF **A01**
Electronics Research Lab., Adelaide (Australia).
A Computer Based Ionospheric Sounding and HF Noise Measuring System.
Technical rept.,
G. F. Earl. Sep 80, 26p Rept no. ERL-0146-TR

A system for the automated collection of ionospheric backscatter sounding and HF noise measurement data is described. The system was configured around a PDP 11/40 minicomputer and modified Barry Research FMCW sounding equipment. The real time digital signal processing associated with the backscatter sounder and noise measurement systems is discussed. The data are displayed and recorded in a calibrated mode, and examples are presented. Deficiencies noted in the operation of the system, and plans for the introduction of oblique and vertical incidence sounding conclude the report. (Author)

AD-A094 280/5 PC **A03**/MF **A01**
Naval Environmental Prediction Research Facility, Monterey, CA.
Assessment/Forecasting of Anomalous Microwave Propagation in the Troposphere Using Model Output.
Final rept.,
Wayne Sweet. Oct 80, 44p Rept no. NEPRF-TR-80-05

A method for forecasting microwave propagation conditions below the 850 mb level is described and evaluated using radiosonde data in the eastern North Pacific Ocean. The method demonstrates good skill in assessing the existence of ducting or normal propagation conditions below the 850 mb level. Duct altitudes are not provided in the assessment, nor are the probabilities of occurrence. The categorical assessment is based on an 850 mb parameter derivable from model output fields, and can be used in ocean regions characterized by a marine inversion below the 850 mb level. The method does not seem useful in ocean regions at high latitudes or in those characterized by warm surface currents. (Author)

21.
PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A094 035/3 PC **A04**/MF **A01**
Universidad Politecnica de Madrid (Spain). Lab. of Fluid Mechanics.
Asymptotic Techniques in Ignition Theory.
Final technical rept. Dec 78-Mar 80,
Manuel Kindelan, and Amable Linan. Dec 80, 63p
Grant DA-ERO-79-G-0007

An analysis is given for the ignition of a reactive material by an electrical wire heated at constant power. The wire temperature history is described for small and large values of the electrical heating rate and for solid and gaseous reactants; in the case of gaseous reactants the effects of convection have also been taken into account. The re-

sults of the analysis include closed form expression for the ignition time in terms of the physicochemical parameters. (Author)

AD-A094 344/9 PC **A03**/MF **A01**
Indiana Univ. at Bloomington. Dept. of Chemistry.
An Approximate Model for the Liberation and Ionization of Atoms from Individual Solute Particles in Flame Spectrometry.
Interim technical rept.,
B. D. Bleasdell, E. P. Wittig, and G. M. Hieftje. 26 Jan 81, 26p Rept nos. TR-31, 39
Contract N00014-76-C-0838

A model is described which incorporates the generation and ionization of atoms during the vaporation of individual solute particles in flames. Particles initially larger than a critical radius have two vaporization rate constants because of a change in the vaporization mechanism related to size. Consequently, the mathematical formulation of the model consists of a series of three equations which are used to curve-fit different portions of emission intensity-time profiles in an air-acetylene flame.

AD-A094 348/0 PC **A04**/MF **A01**
Naval Research Lab., Washington, DC.
A Computational Study of the Chemical Kinetics of Hydrogen Combustion.
Memorandum rept.,
T. L. Burks, and E. S. Oran. 28 Jan 81, 59p Rept no. NRL-MR-4446

A set of elementary reactions and their corresponding rate coefficients has been assembled to describe the homogeneous H2-O2 reaction system over the temperature range 300-3000 K. The reaction mechanism was drawn together assuming that H2-O2 reactive mixtures could be adequately described in terms of self-consistent, thermal distributions of electronically neutral, ground-state reactants, intermediates and products. The resulting time-dependent ordinary differential equations describing the system were integrated assuming various initial pressures, temperatures and initial concentrations of reactants and diluents. The computed results have been compared with experimentally observed induction times, second explosion limits, the rate of reaction above the second explosion limit and the temporal behavior of reaction species. The good agreement between the computational and experimental results attests to the accuracy of the assembled mechanism in its description of the homogeneous reaction system and supports the validity of the set of associated rate coefficients for the elementary reactions of the mechanism over a broad range of reaction conditions. (Author)

AD-A094 582/4 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
A Theoretical and Experimental Approach to Laser Saturation Broadening in Flames,
N. Omenetto, J. Bower, J. Bradshaw, C. A. Van Dijk, and J. D. Winefordner. 26 Oct 79, 14p AFOSR-TR-81-0050
Contract F44620-76-C-0005
Pub. in Jnl. of Quantitative Spectroscopy and Radiative Transfer, v24 p147-158 1980.

No abstract available.

AD-A094 589/9 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Rate Equation Solution for the Temporal Behavior of a Three-Level System,
G. Zizak, J. D. Bradshaw, and J. D. Winefordner. 28 Jun 80, 11p AFOSR-TR-81-0045
Contract F49620-80-C-0005
Pub. in Applied Optics, v19 n21 p3631-3639, 1 Nov 80.

No abstract available.

21C. Electric Propulsion

PB81-856148 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ion Propulsion. January, 1970-October, 1980 (Citations from the NTIS Data Base).
Rept. for Jan 70-Oct 80.
Nov 80, 157p NERACUSGNT1912
Sponsored by National Technical Information Service, Springfield, VA.

The information covers studies and application of ion propulsions or ion thrusters with various elements as feedstock. Application of ion thrusters to rockets, spaceships, and satellites are also discussed. (Contains 159 citations, fully indexed and including a table of contents.)

PB81-856155 PC **N01**/MF **N01**
New England Research Application Center, Storrs, CT.
Ion Propulsion. January, 1970-November, 1980 (Citations from the Engineering Index Data Base).
Rept. for Jan 70-Nov 80.
Nov 80, 101p NERACEI NT1912
Sponsored by National Technical Information Service, Springfield, VA.

Worldwide information covers studies and application of ion propulsions or ion thrusters with various elements as feedstock. Application of ion thrusters to rockets, spaceships, and satellites are also discussed. (Contains 116 citations, fully indexed and including a table of contents.)

21D. Fuels

AD-A094 154/2 PC **A06**/MF **A01**
Michigan Univ., Ann Arbor. W.E. Lay Automotive Lab. (319).
Light Aircraft Engines, the Potential and Problems for Use of Automotive Fuels. Phase I. Literature Search.
Final rept. Oct 79-Sep 80,
D. J. Patterson, K. Morrison, M. Remondino, and T. Slopsema. Dec 80, 122p FAA-CT-81-150
Contract DOT-FA79NA-6083

A comprehensive data research and analysis for evaluating the use of automotive fuels as a substitute for aviation grade fuel by piston-type general aviation aircraft engines is presented. Historically known problems and potential problems with fuels were reviewed for possible impact relative to application to an aircraft operational environment. This report reviews areas such as: fuel specification requirements, combustion knock, preignition, vapor lock, spark plug fouling, additives for fuel and oil, and storage stability. (Author)

AD-A094 382/9 PC **A03**/MF **A01**
San Jose State Univ., CA.
Dynamic, Hot Surface Ignition of Aircraft Fuels and Hydraulic Fluids.
Final rept. Jan 77-Dec 79,
Donald J. Myronuk. Oct 80, 47p AFAPL-TR-79-2095
Grants NSG-2165, NSG-2219

The dynamic surface ignition characteristics of aircraft fuels and hydraulic fluids were investigated on heated stainless steel and titanium surfaces. Local air flow (0.8 to 50 meters per second) (2.4 to 152.4 ft/sec) effects were measured. aircraft fuels evaluated on titanium surfaces ignited (25 to 75 C) (77 to 167 F) lower (500 to 600 C) (932 to 1112 F) than values required to ignite the fuels on a heated stainless steel surface. Higher local surface air speeds necessitated higher surface temperatures for ignition of an applied fluid. The same trends were noted for hydraulic fluids sprayed on the heated surfaces.

AD-A094 567/5 PC **A05**/MF **A01**
Naval Postgraduate School, Monterey, CA.
An Investigation of the Reacting and Non-Reacting Flow Characteristics of Solid Fuel Ramjets.
Master's thesis,
Winston Elliott Scott. Sep 80, 80p

An investigation was conducted to determine the relationship between the non-reacting and the reacting flow characteristics of solid fuel ramjets. Polymethylmethacrylate fuel grains were burned in a ramjet motor on a thrust stand. Combustion efficiency, regression rate profile and pressures were determined for the reacting flows and compared to profiles obtained in non-reacting flows for velocity, pressure, and near-wall and centerline turbulence intensity. Near-wall turbulence profiles were in agreement with the fuel regression profiles obtained in reacting flows. Combustion efficiency was found to be a strong function of mixture ratio. Near-wall mixing significantly increased fuel regression rate. (Author)

EPRI-CS-1517(V.5) PC **A09**/MF **A01**
Bechtel National, Inc., San Francisco, CA.
Coal Preparation Using Magnetic Separation. Volume 5. Evaluation of Magnetic Coal Desulfurization Concepts. Final Report.
Jul 80, 188p

Magnetic separator designs performed by the four contractors under RP980 were reviewed. A complete plant-conceptual design was developed, based on high-gradient magnetic separator (HGMS) designs proposed by Sala Magnetics, Inc., and the Magnetic Corporation of America (MCA). A design for a conventional heavy medium plant was also developed and costed to establish a point of comparison for the HGMS designs. The HGMS design provided by Sala is based on their commercial operating experience in the iron ore concentration industry and operation of a one-ton/hour continuous pilot plant, while the superconducting HGMS proposed by MCA represents a conceptual design based on bench-scale data. The three plants were designed to clean 2.64 million tons/year of feed and produce approximately 2.2 million tons/year of clean coal. Also, as a part of this project, a technical review of the Magnex process (current as of 7/78), as developed by Nedlog Technology Group/Hazen Research, Inc., was performed. Results indicate that the total capital requirement for the Sala and MCA plants was $107,100,000 and $93,500,000, respectively, while the conventional heavy medium plant was $27,400,000 (mid-1978 dollars). Thirty-year levelized operating costs were $25.61/ton and $23.40/ton (based on dry, clean coal) for the HGMS plants, and $7.70/ton for the heavy medium plant. (ERA citation 06:004500)

EUR-6764-FR PC **A05**/MF **A01**
Commission of the European Communities, Luxembourg.
Improvement of the Electrolytic Process of Hydrogen Production. Final Report.
1980, 82p
In French.
U.S. Sales Only.

Testing of electrodes and membranes was performed both separately and in a complete electroysis apparatus. This complete electrolysis apparatus consists of a battery of six electrolyzers with 4 x 15 cm exp 2 electrodes and electrolyte flows and pressurization (4 atm). Main results are a total cell voltage around 1.8 to 1.9 V at 10 kA m exp -2 , 120 exp 0 C 1 to 4 atm, under flow conditions and after aging (1200 h). High-temperature sintered electrodes show good erosion resistance, but diaphragms need external reinforcement not to be eroded. Temperature, pressure and electrolyte flow speed effects were thoroughly examined in order to determine optimal working conditions of the electrolyzers. (ERA citation 06:004611)

IVA-171 PC **A04**/MF **A01**
Ingeniors Vetenskaps Akademien, Stockholm (Sweden).
Maximum Use of Raw Material in Forestry, Sweden.
K. Kilander. Jan 80, 61p
In Swedish.

A survey is given of different investigations of the possibilities to use forest wastes for energy production in Sweden. Several organizations and firms work with systems for felling, transportation, production of chips and pelletization. The forest products can be used for combustion in one-family houses, district heating plants and in industry. (ERA citation 06:004645)

NE/BIO-80/12 PC **A05**/MF **A01**
Lund Univ. (Sweden).

Marine Biomass: Algae as Source of Energy.
L. Edler, T. von Wachenfeldt, and L. Emmelin.
Apr 80, 100p
In Swedish.
U.S. Sales Only.

The report deals with marine algae as a source of renewable energy. Interest has been focused on large (macroscopic) species of algae. They grow along all coasts and are naturally highly productive. Calculations based on data from laboratory and field measurements indicate that a production of as much as 115 tons of algae (dry matter) per hectare and year could be achieved. Culture of marine algae would along the Swedish coast probably take place in shallow, sheltered waters. Using a succession of naturally occuring species a growing season of 240 days could be achieved. With a production of 115 tons dm.ha exp -1 .year exp -1 an output of approx. 110 MWhT.ha exp -1 .year exp -1 of methane gas would be feasible using anaerobic fermentation. The area of the Baltic inside the 5-m depth curve is 19,000 sq km. If 10% of this area were available a production of around 20TWhT of gas annually would be the maximum potential of the system. The report describes a system for growing algae in the shallow marine environment. Energy analysis of the system indicates that approx. 5% of the energy output from an algae based methane plant would be required for growth, harvesting and conversion to methane. (ERA citation 06:004619)

PATENT-4 229 196 Not available NTIS
National Aeronautics and Space Administration, Cleveland, OH. Lewis Research Center.
Atomic Hydrogen Storage Method and Apparatus.
Patent,
J. A. Woollam. Filed 6 Feb 79, patented 21 Oct 80, 4p N81-14103/8, PAT-APPL-6-009 887
Supersedes PAT-APPL-6-009 887, N79-18455 (17-09, p 1157).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

Atomic hydrogen, for use as a fuel or as an explosive, is stored in the presence of a strong magnetic field in exfoliated layered compounds such as molybdenum disulfide or an elemental layer material such as graphite. The compounds maintained at liquid helium temperatures and the atomic hydrogen is collected on the surfaces of the layered compound which are exposed during delamination (exfoliation). The strong magnetic field and the low temperature combine to prevent the atoms of hydrogen from recombining to form molecules.

PB81-135030 PC **A02**/MF **A01**
Bureau of Mines, Avondale, MD. Avondale Research Center.
Development of Analytical Reference Materials for Refuse-Derived Fuels.
Rept. of investigations/1980,
Stephen L. Law, Benjamin W. Haynes, and William J. Campbell. 1980, 17p BUMINES-RI-8426

Municipal solid waste (MSW), presently a major disposal problem, represents a significant source of metals and glass together with a combustible fraction that could be used to supplement coal and oil and in generating heat and electricity. This combustible fraction represents approximately 70 weight-percent MSW; therefore, effective utility of this fraction is an essential part of the Bureau of Mines program to conserve and increase the Nation's mineral and fuel supply through recycling of urban waste. Because of the increasing national interest in this important fuel supplement, the U.S. Department of the Interior, Bureau of Mines prepared a refuse-derived fuel material as a proposed reference material for use by other laboratories to evaluate their analytical procedures. This reference material was prepared by combining MSW light combustibles from Tampa, FL., Montgomery County, MD., and Tulsa, OK., then shredding, milling, and blending the composite material. Homogeneity of the refuse-derived fuel reference material (RDFRM) appears to be acceptable based on analytical values for replicate analyses. Concentration data for major, minor, and trace elements together with proximate analyses are provided in this report. Aliquots of the RDFRM are available to interested laboratories upon request.

PB81-141590 PC **A08**/MF **A01**
Midwest Research Inst., Kansas City, MO.
Processing Equipment for Resource Recovery Systems. Volume II. Magnetic Separators, Air Classifier and Ambient Air Emissions Tests.
Final rept.,
B. W. Simister, and David Bendersky. Jul 80, 172p EPA-600/2-80-007B
Contract EPA-68-03-2387

This report presents the results of a study of equipment and systems for processing municipal solid wastes into energy related products. The study was divided into three phases. The first phase was devoted to a study of the state of the art and formulation of the research needs. The second phase was devoted to field tests of magnetic separators, air classifier and air emissions. The third phase is involved with field tests of shredders.

PB81-144347 PC **A02**/MF **A01**
North Central Forest Experiment Station, St. Paul, MN.
Fuelwood Production in Rural Minnesota, 1975.
Forest Service research bulletin (Final),
James E. Blyth, and Steven Wilhelm. Sep 80, 10p FSRB-NC-47

This report discusses and analyzes 1975 fuelwood production in rural Minnesota from roundwood and primary wood-using mill residue. It compares production in 1975 with production in 1960 and 1970. The outlook for future fuelwood production and potential impact on Minnesota's forest industry is assessed.

PB81-154973 PC **A04**/MF **A01**
Pennsylvania State Univ., University Park.
Importance of Active Sites for Char Gasification in Oxygen (Air) and Carbon Dioxide.
Annual rept. 1 Oct 79-30 Sep 80,
P. L. Walker, Jr., R. G. Jenkins, and L. R. Radovic. 20 Oct 80, 73p GRI-79/0084
Contract GRI-5014-363-0235

Lignite chars have been produced by rapid pyrolysis of the coal precursor in an entrained-flow reactor at widely differing conditions of gas temperatures (700-1000C) and residence times (0.2-1800s). Gas temperatures were measured in the reactor by suction pyrometry, taking into account the different cooling effects of the water-cooled char collector at different axial positions of the collector in the reaction zone and the decrease in suction pyrometer efficiency with increasing reaction temperature. A kinetic analysis of the lignite weight loss results was made. It shows a continuous decrease of the apparent first-order rate constant with conversion and a corresponding continuous increase in the apparent activation energy.

PB81-802068 PC **N01**/MF **N01**
New Mexico Univ., Albuquerque. Technology Application Center.
Hydrogen Use as a Fuel. 1977-October, 1980 (Citations from the International Aerospace Abstracts Data Base).
Rept. for 1977-Oct 80.
Oct 80, 39p
Supersedes NTIS/PS-79/0771. Sponsored by National Technical Information Service, Springfield, VA.

These citations from the international literature concern the use of hydrogen as a fuel for aircraft and automobiles. Topics covered by these articles include storage, fuel combustion studies, gas mixtures, and energy conversion efficiency. Does not include articles dealing with hydrogen production. (This updated bibliography contains 137 citations, 4 of which are new additions to the previous edition.)

STU-78-5376 PC **A04**/MF **A01**
Svenska Traeforskningsinstitutet, Stockholm.
Pressing of Bark.
G. Beyer. Apr 80, 55p
In Swedish.

A high percentage of moisture in bark makes it less attractive as a fuel because the calorific value decreases as well as the efficiency of baiers. The most widely used method to lessen the percentage of moisture is to press the bark. Usually a dry content of 40% is achieved. In this report laboratory experiments to improve the pressing methods are described. It was found that storage time, way of storage, and season influenced the properties of the bark. hence it was difficult to get reproducible tests. However a few tendencies were demonstrated: higher dry content is achieved with slow pressing than with fast; the pressure can vary between 2 and 6 MPa without influencing the result; sodium carbonate lowers surface tension; repeated pressing or higher temperature do not seem to influence the result; poorer results are achieved with bark from timber that has been stored in the sea; better results can be achieved by stack storage a short time before pressing; and good results have been achieved with roller press. (ERA citation 06:004660)

21E. Jet and Gas Turbine Engines

AD-A094 291/2 PC **A99**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 2. Theoretical Developments and Basic Experiments.
Final rept. Oct 73-Aug 77,
T. F. Balsa, P. R. Gliebe, R. A. Kantola, R. Mani, and E. J. Stringas. May 78, 719p R78AEG323, FAA-RD-76-79-2
Contract DOT-OS-30034
See also Task 2, Supplement, AD-A094 292.

This report presents the results of Task 2 conducted under the subject program over a period of 45 months. Task 2 was formulated as a fundamental theoretical and experimental study aimed at an understanding of the noise generation and suppression mechanisms of high velocity jets. The mechanisms investigated included changes in turbulence structure, fluid shielding, and alteration of convective amplification of jet noise sources. Several other areas such as physical shielding, shock associated noise, lip noise, effect of fluid/particle additives on jet noise, orderly structure in jets, ejector aeroacoustics, and flight effects on jet noise were also investigated. The most significant achievements of Task 2 were as follows. A unified aeroacoustic theory composed of three ingredients were developed: (1) the prediction of mean properties of the jet plume, (2) deduction of turbulence properties relevant to jet noise by similarity arguments, and (3) the prediction of far-field noise including the effects of fluid shielding. A semiempirical shock noise prediction procedure was also developed. Exhaustive theory-data comparisons for a wide range of nozzle configurations and velocity/temperature combinations were conducted and have confirmed the essential validity of this model as a prediction tool. A comprehensive series of experiments with simple suppressor elements (such as a single rectangular tube, twin jets, linear arrays of jets, circular arrays of jets) was carried out and revealed the importance of acoustic shielding by adjacent jets. A fundamental series of experiments, specifically tailored to reveal fluid shielding as a jet noise suppression mechanism, was successfully conducted.

AD-A094 292/0 PC **A07**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 2 Supplement. Computer Program for Calculating the Aeroacoustic Characteristics of Jets form Nozzles of Arbitrary Shape.
Final rept. for period ending Oct 77,
P. R. Gliebe. May 78, 145p R78AEG324, FAA-RD-76-79-2A
Contract DOT-OS-30034
Supplement to Task 2, AD-A094 291. See also Task 3, Volume 1, AD-A094 293.

A computational procedure is presented for predicting the aerodynamic and acoustic characteristics of jets from nozzles of arbitrary shape. The procedure treats the jet plume as a collection of

uncorrelated multipole sound sources which convect with the flow. The aerodynamic characteristics of the jet are evaluated utilizing an extension of Reichardt's theory for free turbulent flows. The acoustic radiation from each of the sound sources is evaluated from high-frequency asymptotic solutions of Lilley's equation. The jet plume is subdivided into several hundred elemental volume sources, each roughly the size of a turbulent eddy volume. The correlated sound level spectra of the individual eddy volumes are summed on a mean-square pressure basis to yield the total turbulent mixing noise levels. An auxiliary calculation of shock-cell broadband noise is made and added to the turbulent mixing noise spectrum to give the total farfield noise. A description of the computational model and associated computer program is presented herein, along with a sample of input and output. A FORTRAN listing of the computer program is also included. (Author)

AD-A094 293/8 PC **A16**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 3. Experimental Investigation of Suppression Principles. Volume I. Suppressor Concepts Optimization.
Final rept. Oct 74-Oct 77,
R. H. Brown, W. S. Clapper, W. Joy, M. A. Smith, and E. J. Stringas. Dec 78, 371p R78AEG627-VOL-1, FAA-RD-76-79-3-1
Contract DOT-OS-30034
See also Task 3, Volume 2, AD-A094 294.

Experimental investigations of suppression principles were conducted including developing an experimental data base, developing a better understanding of jet noise suppression principles, and formulating empirical methods for the acoustic design of jet noise suppressors. Acoustic scaling has been experimentally demonstrated, and five 'optimum' nozzles have been selected for subsequent anechoic free-jet testing. This report is organized into four volumes under separate cover: Volume I - Verification of Suppression Principles and Development of Suppression Prediction Methods, Volume II - Parametric Testing and Source Measurements, Volume III - Suppressor Concepts Optimization, and Volume IV - Laser Velocimeter Time-Dependent Cross Correlation Measurements. The experimental studies reported in Volume II involved acquisition of detailed far-field, acoustic data and of aerodynamic jet-flow-field data on several baseline and noise-abatement nozzles. These data were used to validate the theoretical jet noise prediction method of Task 2 and to develop and validate the empirical noise-prediction method presented herein. A series of seven suppressor configurations (ranging from geometrically simple to complex) were tested to establish the relative importance of four jet noise mechanisms (fluid shielding, convective amplification, turbulent mixing, and shock noise). In general, mechanical suppressors exhibit a significant reduction in shock noise relative to a baseline conical nozzle, reduce the effectiveness of fluid shielding (increase rather than suppress noise), reduce the effectiveness of convective amplification (reduce noise), and produce a modest reduction in turbulent mixing noise.

AD-A094 294/6 PC **A99**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 3. Experimental Investigation of Suppression Principles Volume II. Parametric Testing and Source Measurements.
Final rept. Oct 74-Apr 78,
J. F. Brausch, W. S. Clapper, P. F. Scott, M. A. Smith, and E. J.Stringas. Dec 78, 869p R78AEG627-VOL-2, FAA-RD-76-79-3-2
Contract DOT-OS-30034
See also Task 3, Volume 3, AD-A094 295.

Experimental investigations were conducted of suppression principles, including developing an experimental data base, developing a better understanding of jet noise suppression principles, and formulating empirical methods for the acoustic design of jet noise suppressors. Acoustic scaling has been experimentally demonstrated, and five 'optimum' nozzles have been selected for subsequent anechoic free-jet testing. A series of experimental tests was conducted to provide farfield acoustic data on 47 baseline and suppressor nozzle configurations and to provide aerodynamic nozzle performance on 18 of the configurations. Suppressor design parameters evaluated experimentally included: suppressor area ratio, radius ratio, flow management, inner stream geometry, element number and type, treated ejectors on multielement and unsuppressed inverted-coannualar-flow nozzles. Parametric testing established suppression levels for single and dual flow nozzles during static operation. Selective free-jet tests conducted on eight configurations were utilized to establish flight suppression levels for plug, chute, tube and hole nozzles. The aerodynamic performance test program illustrated that suppressed exhaust nozzles which incorporate elemental base areas as an integral part of the design are sensitive to external Mach number. In general suppressor element base drag was the most significant loss mechanism. This volume is part of the four volume set that constitutes the Task 3 final report.

AD-A094 295/3 PC **A08**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction Task 3. Experimental Investigaton of Suppression Principles Volume III. Suppressor Concepts Optimization.
Final Rept. Oct 74-Oct 77,
R. H. Brown, W. S. Clapper, W. Joy, M. A. Smith, and E. J. Stringas. Dec 78, 170p R78AEG627-VOL-3, FAA-RD-76-79-3-3
Contract DOT-OS-30034
See also Task 3, Volume 4, AD-A094 296.

Experimental investigations were conducted of suppression principles, including developing an experimental data base, developing a better understanding of jet noise suppression principles, and formulating empirical methods for the acoustic design of jet noise suppressors. Acoustic scaling has been experimentally demonstrated, and five 'optimum' nozzles have been selected for subsequent anechoic free-jet testing. Several studies were conducted to attempt an optimization of suppressor concepts. Trade studies of performance versus suppression, aircraft integration studies, and development of a figure-of-merit method of analysis all make up the activities in this 'optimization' process. The end product of this effort was to design five nozzles for static and free-jet testing. Demonstration of acoustic scaling for several suppressor configurations was conducted to assure the adequacy of using scale-model results to project full-scale suppression levels. Full-scale data were obtained on several suppressor configurations using J79 and J85 engines. Scale-model data were obtained for these same configurations to allow comparison of scale-model and full-scale results.

AD-A094 296/1 PC **A08**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 3. Experimental Investigation of Suppression Principles. Volume IV. Laser Velocimeter Time Dependent Cross Correlation Measurements.
Final rept. Oct 74-Oct 77,
P. R. Knott, P. F. Scott, and P. W. Mossey. Dec 78, 155p R78AEG627-VOL-4, FAA-RD-76-79-3-4
Contract DOT-OS-30034
See also Task 4, AD-A041 849.

Experimental investigations were conducted of suppression principles; including developing an experimental data base, developing a better understanding of jet noise suppression principles, and formulating empirical methods for the acoustic design of jet noise suppressors. Acoustic scaling has been experimentally demonstrated, and five 'optimum' nozzles have been selected for subsequent anechoic free-jet testing. In-jet/in-jet and in-jet/far-field exhaust noise diagnostic measurements were conducted using a Laser Velocimeter (LV). Measurements were performed on a conical nozzle and a coannular plug nozzle. Two-point, space/time measurements using a two-LV system were completed for the conical nozzle. Measurements of mean velocity, turbulent velocity, eddy convection speed, and turbulent length scale were made for a subsonic ambient jet and for a sonic heated jet. For the coannular plug nozzle, a similar series of two-point, laser-correlation measurements were performed. In addition, cross correlations between the laser axial component of turbulence and a far-field acoustic microphone were performed. This volume is part of the four volume set that constitutes the Task 3 final report. The other volumes are: Volume I-Verification of Suppression Principles and Development of Suppression Prediction Methods, Volume II-Parametric Testing and Source Measurements, Volume III-Suppressor Concepts Optimization. (Author)

AD-A094 297/9 PC **A09**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 5. Investigation of 'In-Flight' Aeroacoustic Effects on Suppressed Exhausts.
Final rept. Dec 76-Jul 78,
N. Baumgardt, J. F. Brausch, W. S. Clapper, R. Mani, and E. J. Stringas. Jan 79, 194p R78AEG628, FAA-RD-76-79-5
Contract DOT-OS-30034
See also Task 6, Supplement, AD-A094 298.

The flight noise characteristics in terms of peak noise, directivity and spectra were projected for five suppressor nozzle designs. Static and flight suppression levels were established using conical nozzle data as a reference. The noise characteristics were determined by testing each nozzle design in the anechoic free jet facility and then applying a transformation to account for dynamic effects. The transformation process is described and a computer program with instructions is presented. Each of the five suppressor nozzles was selected by balancing suppression level, performance loss, and mechanical complexity. Weight estimates and performance estimates are presented. An assessment is made on how these suppressors affect the noise versus performance trades for typical variable cycle engine (VCE) operating conditions. Suppressors are found to have minimal peak noise suppression loss in flight at high velocities. As mass average velocity decreases, the flight peak noise suppression levels are less than those measured statically from 0 to 5 PNdB. In all cases, the suppressors were quieter than the conical nozzle in flight. In the forward quadrant, multielement suppressors are effective in reducing shock noise; also, the forward quadrant noise for a suppressor is not amplified to the same degree as a conical nozzle. Overall suppression characteristics measured statically are different than in-flight and are function of the specific suppressor design. (Author)

AD-A094 298/7 PC **A10**/MF **A01**
General Electric Co., Cincinnati, OH. Aircraft Engine Group.
High Velocity Jet Noise Source Location and Reduction. Task 6. Supplement. Computer Programs: Engineering Correlation (M*G*B) Jet Noise Prediction Method and Unified Aeroacoustic Prediction Model (M*G*B) for Nozzles of Arbitary Shape.
Final rept. Jul 73-Jul 78,
P. R. Gliebe, R. E. Motsinger, and A. Sieckman. Mar 79, 215p R79AEG290, FAA-RD-76-79-6A
Contract DOT-OS-30034
See also Task 1, AD-A041 848.

This General Supplement Report documents two Computerized Jet Noise Prediction Techniques: the Engineering Method and the Unified Aeroacoustic Prediction Model. A complete description of the computer programs is provided, including examples of input preparation and output cases, plus a listing of the FORTRAN computer code. The comprehensive, empirical, jet noise prediction method has been developed by correlating extensive data from this program and available data from other published sources. The data were correlated by means of basic engineering principles and physical parameters. The resulting prediction method includes unsuppressed conical nozzles; multitube and multichute single- and dual-flow suppressed nozzles; and multitube/multichute nozzles with hardwall and treated sectors. A unified aerodynamic/acoustic prediction technique has also been developed for assessing the noise characteristics of suppressor nozzles. The technique utilizes an extension of Reichardt's method so as

to provide predictions of a jet plume flow field. The turbulent fluctuations in the mixing regions of the jet are assumed to be the primary source of noise generation, as in Classical Theories of Jet Noise. The alteration of the generated noise by the jet plume itself as it propagates through the jet to the farfield is modeled utilizing the high-frequency shielding theory based on Lilley's equation. These basic modeling elements have been coupled together in a discrete volume-element formulation. The individual volume elements are assumed to be uncorrelated with each other, so that the total contribution to the farfield is simply the sum of the individual volume element contributions.

AD-A094 422/3 PC **A11**/MF **A01**
Pennsylvania State Univ., State College. Applied Research Lab.
Experimental Verification of the Streamline Curvature Numerical Analysis Method Applied to the Flow through an Axial Flow Fan.
Technical memo.,
M. J. Pierzga. 28 May 80, 238p Rept no. ARL/PSU/TM-80-181
Contract N00024-79-C-6043

To verify the results of a streamline curvature numerical analysis method, an investigation has been conducted in which comparisons are made between analytical and experimental data of an axial flow fan. Using loss model calculations to determine the proper outlet flow deviation angles, the flow field in the hub-to-tip plane of the turbomachine was calculated. These deviation angle calculations allow the inviscid streamline curvature (SLC) analysis to model a real fluid with viscous losses. The verification of this calculated flow field is the primary objective of the investigation; however, in addition to the hub-to-tip flow field, the numerical analysis of the blade-to-blade flow field was also investigated in some detail. To verify the accuracy of the numerical results, detailed flow surveys were conducted upstream and downstream of the test rotor of the axial flow fan. To obtain the necessary data to verify the blade-to-balde solution, internal blade row data were also collected. The internal blade row measurements were obtained by using a rotating circumferential traversing mechanism which was designed and implemented during this investigation. Along with these two sets of survey data, the static pressure distributions on the pressure and suction surfaces of the test rotor were also obtained.

AD-A094 442/1 PC **A03**/MF **A01**
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
Allison PD370-41 Derivative Turboprop Engine.
Final rept. Oct 78-Feb 79,
P. Stolp. Feb 79, 38p DDAD-EDR-9776A, NADC-80181-D-60
Contract N62269-78-C-0415

This study developed data on Detroit Diesel Allison (DDA) common core derivative engines for use in Maritime Patrol Aircraft (MPA) concept formulation studies. The study included the screening of potential DDA turboprop/turboshaft engines and the preparations of technical and planning information on three of the most promising engine candidates plus an all new engine. Screening of DDA derivative candidates was performed utilizing an analytical MPA model using synthesized mission profiles to rank the candidates in terms of fuel consumption, weight, cost and complexity. The three turboprop engines selected for further study were as follows: a derivative of the unity size T701-AD-700 shaft power engine with rematched turbine (PD 370-37), and an advanced T701 turboprop derivative with 25:1 overall pressure ratio and a scaled ATEGG demonstrated compressor (PD 370-40), an advanced T701 turboprop derivative with 17.7:1 overall pressure ratio and a scaled ATEGG demonstrated compressor (PD 370-41). Data is also presented on a new advanced turboprop engine with 30:1 overall pressure ratio which incorporates compressor, combustor, turbine, and cooling technology now under development and demonstration at DDA. The documentation consists of six separate reports prepared in the following manner. One report summarizes the engine screening analysis and describes the approach to, and the conclusions of the study. A separate report for each of the three derivative engines and for the new turboprop present estimates of performance, weight, and dimensional data. The engineering budgetary estimates of the development, acquisition, and service costs for each of the four engines are presented in a separate report. (author)

AD-A094 443/9 PC **A03**/MF **A01**
General Motors Corp., Indianapolis, IN. Detroit Diesel Allison Div.
Allison PD370-42 Advanced Turboprop Engine.
Final rept. Oct 78-Feb 79,
P. Stolp. Feb 79, 38p DDAD-EDR-9777A, NADC-80181-E-60
Contract N62269-78-C-0415

This study developed data on Detroit Diesel Allison (DDA) common core derivative engines for use in Maritime Patrol Aircraft (MPA) concept formulation studies. The study included the screening of potential DDA turboprop/turboshaft engines and the preparation of technical and planning information on three of the most promising engine candidates plus an all new engine. Screening of DDA Derivative candidates was performed utilizing an analytical MPA model using synthesized mission profiles to rank the candidates in terms of fuel consumption, weight, cost and complexity. The three turboprop engines selected for further study were as follows: a derivative of the unity size T701-AD-700 shaft power engine with rematched turbine (PD 370-37), an advanced T701 turboprop derivative with 25:1 overall pressure ratio and a scaled ATEGG demonstrated compressor (PD 370-40), an advanced T701 turboprop derivative with 17.7:1 overall pressure ratio and a scaled ATEGG demonstrated compressor (PD 370-41). Data is also presented on a new advanced turboprop engine with 30:1 overall pressure ratio which incorporates compressor, combustor, turbine, and cooling technology now under development and demonstration at DDA. The documentation consists of six separate reports prepared in the following manner. One report summarizes the engine screening analysis and describes the approach to, and the conclusions of the study.

AD-A094 615/2 PC **A04**/MF **A01**
Naval Postgraduate School, Monterey, CA.
Validation of a Two-Dimensional Primitive Variable Computer Code for Flow Fields in Jet Engine Test Cells.
Final rept.,
Paul J. Mallon, Patrick J. Hickey, and David W. Netzer. Oct 80, 73p Rept no. NPS67-80-014

Pressure and velocity data were collected in a full scale jet engine test cell in order to validate the predictive accuracy of a two-dimensional and axisymmetric primitive variable computer code. It was found that the model reasonably predicted the velocity profiles in the augmentor tube. Inaccuracy increased at higher engine thrust settings at positions far downstream in the augmentor tube. Predicted pressure profiles were reasonable but the magnitudes were in considerable error at high flow rates. (Author)

PAT-APPL-6-192 163 PC **A02**/MF **A01**
Department of the Air Force, Washington, DC.
Small Gas Turbofan Engine with Regenerating Diffuser.
Patent Application,
Stanley H. Ellis. Filed 30 Sep 80, 12p AD-D008 049/9
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

A mixed flow, high bypass, gas turbofan engine that is small and compact, and that develops a thrust in the range of approximately 200-300 pounds. The engine has an axial length of approximately 18 inches, an air inlet of approximately 10 inches in diameter, and an exhaust nozzle of approximately 6 inches in diameter. To reduce engine length high pressure compressor diameter, a high pressure compressor is positioned in a location that is displaced from and is preferably parallel to the engine axis (i.e., centerline), a burner (i.e., combustion chamber) is similarly positioned on the other side of the engine axis, only one turbine is used, and a unique flow path also is used. In addition, a heat exchanger of the regenerative type which includes a plurality of pipe diffusers is used, and it is positioned in the hot exhaust flow of the single turbine to pre-heat the compressor air prior to entry into the burner. Further, a gear shift may be used with the compressor to give better part-power performance. The small size, the thrust capability, and the good fuel consumption during part-power operation, make this engine ideal for use in air-launched cruise missiles. (Author)

PATENT-4 228 656 Not available NTIS
National Aeronautics and Space Administration, Pasadena, CA. Pasadena Office.
Power Control for Hot Gas Engines.
Patent,
W. F. Macglashan. Filed 19 May 78, patented 21 Oct 80, 10p N81-14318/2, PAT-APPL-907 421
Supersedes PAT-APPL-907 421-78, N78-25430 (16 - 16, p 2122). Sponsored by NASA.
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A hot gas engine in which the expander piston of the engine is connected to an expander crankshaft. A displacer piston of the engine is connected to a separate displacer crankshaft which may or may not be coaxial with the expander crankshaft. A phase angle control mechanism used as a power control for changing the phase angle between the expander and displacer crankshaft is located between the two crankshafts. The phase angle control mechanism comprises a differential type mechanism comprised of a pair of gears, as for example, bevel gears, one of which is connected to one end of the expander crankshaft and the other of which is connected to the opposite end of the displacer crankshaft. A mating bevel gear is disposed in meshing engagement with the first two level gears to provide a phase angle control between the two crankshafts. Other forms of differential mechanisms may be used including conventional spur gears connected in a differential type arrangement.

PATENT-4 239 053 Not available NTIS
Department of the Air Force, Washington, DC.
Fuel Flow Distribution System.
Patent,
Richard H. Cornell. Filed 7 Feb 79, patented 16 Dec 80, 8p AD-D008 059/8, PAT-APPL-6-010 091
Supersedes PAT-APPL-6-010 091, AD-D005 930.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A fuel flow distribution system having a hydraulically actuated flow sensing valve, a hydraulically operated switch assembly and at least one hydraulically operated on-off valve assembly. These elements are operably connected to a metered flow manifold and a plurality of distributor lines. The flow sensing valve supplies fuel to the manifold. Various flow rates of the fuel within the distributor lines causes the flow sensing valve to emit a single. Upon receipt of this signal the switch assembly transmits the signal to the valves making up each valve assembly. The on-off valve assembly (assemblies) alters the flow restriction at the distributor lines in such a manner as to limit the change of pressure therein. (Author)

PATENT-4 239 155 Not available NTIS
Department of the Navy, Washington, DC.
Core-Flow Rotary Jet.
Patent,
Joseph V. Foa. Filed 30 May 79, patented 16 Dec 80, 5p AD-D008 040/8, PAT-APPL-6-043 927
Supersedes PAT-APPL-6-043 927, AD-D006 687.
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC 20231 $0.50.

A rotary jet including a core-flow arrangement minimizes flow separation of primary and induced secondary flows over the afterbody of the jet rotor. By discharging a small portion of the primary jet through a central opening in the afterbody concentric with the nozzled rotor, a favorable pressure gradient is generated over the surface of the afterbody, which helps reduce or prevent flow separation thereover. (Author)

PB81-137531 PC **A03**/MF **A01**
General Accounting Office, Washington, DC. Procurement and Systems Acquisition Div.
Is the Joint Air Force/Navy Alternate Engine Program Workable. GAO Thinks Not as Presently Structured.
Report to the Congress.
9 May 80, 36p PSAD-80-40

The Department of Defense is developing a backup engine, the F101DFE, for the engines in the Navy's F-14 and the Air Force's F-16 fighter aircraft in the event the improvement programs for those engines fail. Unfortunately, the F101DFE program in its present form does not promise that a production engine with the required performance and supportability characteristics will be available when or if needed or that using the backup engine will be cost effective and affordable.

PB81-139677 PC **A09**/MF **A01**
General Electric Co., Schenectady, NY.
Assessment of Gas Turbine Erosion. Volume II. Erosion Analysis and Test Planning,
Ralph R. Boericke, Delton A. Grey, Donald R. Spriggs, Robert G. Hantman, and Jing T. Kuo.
Apr 80, 196p NYSERDA-80-3-2
See also Volume 1, PB81-139685.

Pressurized fluidized bed combustion has been studied and tested as an economical and environmentally acceptable approach to generating electricity from coal. A key feature of this concept is combined-cycle operation in which a steam turbine is powered from steam tubes immersed in the fluidized bed while the hot combustion gases are used to drive a gas turbine. A key technical area, addressed in both volumes, is the erosion and corrosion of the gas turbine blades by particles and alkali salts carried by the combustion gases. Volume 1 summarizes the literature on the operation of gas turbines in environments similar to the pressurized fluidized bed combustion system. Based on that survey, Volume 2 provides analyses of the impact of the many components of the fluidized bed system on the turbine and also sets up a test plan including the design of an erosion, corrosion simulator for further study.

PB81-139685 PC **A07**/MF **A01**
General Electric Co., Schenectady, NY.
Assessment of Gas Turbine Erosion. Volume I. Assessment of Available Erosion Data,
Ralph R. Boericke, Delton A. Grey, Donald R. Spriggs, Robert G. Hantman, and Jing T. Kuo.
Apr 80, 150p NYSERDA-80-3-1
See also Volume 2, PB81-139677.

Pressurized fluidized bed combustion has been studied and tested as an economical and environmentally acceptable approach to generating electricity from coal. A key feature of this concept is combined-cycle operation in which a steam turbine is powered from steam tubes immersed in the fluidized bed while the hot combustion gases are used to drive a gas turbine. A key technical area. addressed in both volumes, is the erosion and corrosion of the gas turbine blades by particles and alkali salts carried by the combustion gases. Volume 1 summarizes the literature on the operation of gas turbines in environments similar to the pressurized fluidized bed combustion system.

21G. Reciprocating Engines

AD-A094 221/9 PC **A03**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Measurements of Temperature and N2 Number Density in the Combustion Cylinder of a Compression Ignition Engine Utilizing Laser-Raman Diagnostics.
Final rept. 24 Feb-1 Oct 80,
W. D. Williams, J. W. L. Lewis, and J. H. Jones.
Jan 81, 46p Rept no. ADEC-TR-80-55
Prepared in cooperation with ARO, Inc., Tullahoma, TN.

Laser-Raman scattering has been used to measure temperature and nitrogen number density in the combustion cylinder of a specialized research CI engine. Measurements were made as a function of crank angle degrees (CAD) for unfueled operation at 500 and 1,000 rpm and for operation at 1,000 rpm using n-heptane as an alternate fuel to diesel fuel no. 2. A pulsed ruby laser system was the excitation source for the Raman scattering, and the CAD resolution of the measurements was .0015 to 0.36 degrees. (Author)

21H. Rocket Motors and Engines

AD-A094 433/5 PC **A03**/MF **A01**
Georgia Inst. of Tech., Atlanta. School of Aerospace Engineering.
Rocket Research at Georgia Tech.
Interim technical rept.,
E. W. Price, W. C. Strahle, B. T. Zinn, J. E. Hubbartt, and R. K. Sigman. Nov 80, 48p
AFOSR-TR-81-0018
Contract F49620-78-C-0003

Task I. During the reporting period, the impedance tube setup was utilized in the determination of the admittances ot two aluminized solid propellants. Both the pressure coupled response and the gas phase losses have been determined over the frequency range of 400-1200 Hertz. In a separate study, the feasibility of utilizing either quartz or piezoceramic crystals in the direct measurement of the mass loss of burning solid propellants has been investigated. Finally studies aimed at the adaptation of the impedance tube setup for the measurement of the simulating heating values for practical propellants, have been started. Task II. Studies were continued on burning in and around the near wake of an axisymmetric model at Mach 3. Burning tests with radiant and axial injection of pure hydrogen have been completed. Burning tests with axial injection of diluted hydrogen, velocity coupled response of burning solid propellant has been initiated. Task III. Further studies were made of aluminum accumulation and agglomeration on the propellant burning surface and droplet combustion in the gas flow from the surface. Modification of the aluminum powder to control agglomeration were evaluated by propellant combustion studies and found to be highly effective. Task IV. Experimental and analytical studies were continued on the subject of turbulence-induced pressure flucuations in a rocket-like cavity. An advanced theory has provided closure between theory and experiment on one experimental facility. A fuel rocket motor simulator was built and preliminary results were attained to show the separation between propagational sound and local hydrodynamic noise.

21I. Rocket Propellants

AD-A094 160/9 PC **A02**/MF **A01**
Florida Univ., Gainesville. Dept. of Chemistry.
Synthesis of Methylhydrazine and 1,1-Dimethylhydrazine by the Reactions of Hydroxylamine-O-Sulfonic Acid with Methyl- and Dimethylamine,
Harry H. Sisler, Milap A. Mathur, and Sampat R. Jain. 13 Feb 80, 4p AFOSR-TR-80-1283
Grant AFOSR-80-0007
Pub. in Inorganic Chemistry, v19 n9 App 1 p2846-2848 1980.

No abstract available.

PAT-APPL-6-196 893 PC **A02**/MF **A01**
Department of the Navy, Washington, DC.
Gas Generant Propellants.
Patent Application,
Russell Reed, Jr., Benjamin Y. S. Lee, and Ronald A. Henry. Filed 14 Oct 80, 14p AD-D007 998/8
Availability: This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of application available NTIS.

This invention relates to a gas generant propellant composition having low flame temperatures comprising an elastomeric binder consisting of a mixture of polyethylene capped polypropylene glycol and a dihydroxy tetrazole; a curative agent such as the biuret trimer of hexamethylene diisocyanate; a plasticizer agent such as 1-methyl-5 (methoxyethyl) tetrazole; a coolant agent such as oxamide; and a deflagrating agent selected from the group consisting of: dihydrazinium 3,6-bis(5-tetrazolyl)-1,2-dihydrotetrazine dinitrosopentamethylene tetramine, the reaction product of glyoxal and hydrazine and the ammonium salt of 5-nitramino tetrazole.

22.

SPACE TECHNOLOGY

22B. Spacecraft

AD-A094 278/9 PC **A04**/MF **A01**
Arnold Engineering Development Center, Arnold AFS, TN.
Aerothermal Tests of the Space Shuttle Solid Rocket Booster Instrumentation Islands at Mach Numbers 1.75 to 10.
Final rept. 14 Jan-5 May 80,
D. W. Stallings, and M. O. King. Jun 80, 63p
Rept no. AEDC-TSR-80-V28
Prepared in cooperation with ARO, Inc., Tullahoma, TN. Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

The Space Shuttle Solid Rocket Booster Instrumentation Islands were tested at Mach numbers 1.75, 2.25, 3, and 10 for Reynolds numbers ranging from .600000 to 4740,000 per foot to evaluate potential error sources which might influence the flight test data. The test specimens were instrumented with flight tranducers and with VKF transducers as reference standard. They were mounted on a wedge and tested at wedge angles ranging from 3 to 25 deg. In addition, for the Mach number 10 tests, the VKF infrared system was used to monitor the surface temperature of the test specimens. (Author)

PATENT-4 219 171 Not available NTIS
National Aeronautics and Space Administration, Greenbelt, MD. Goddard Space Flight Center.
Device for Coupling a First Vehicle to a Second Vehicle.
Patent,
A. A. Rudmann. Filed 6 Feb 79, patented 26 Aug 80, 10p N81-14320/8, PAT-APPL-6-009 888
Supersedes PAT-APPL-6-009 888, N79-19364 (17-10, p 1285).
This Government-owned invention available for U.S. licensing and, possibly, for foreign licensing. Copy of patent available Commissioner of Patents, Washington, DC. 20231 $0.50.

A device is disclosed, carried by a first vehicle such as an orbiting space shuttle, having a plurality of contact members for engaging and holding an annular ring on a second vehicle such as an orbiting payload. The contact members are connected to manipulator arms which are mounted at a fulcrum point and which are moved by an iris type mechanism. Movement of the manipulator arms causes the contact members to grasp or release the annular ring. Bumper devices are provided to axially align the annular ring and draw the contact members into engagement therewith.

KEYWORD INDEX

NTIS®

Index entries in this section are selected to indicate important ideas and concepts presented in a report. When using the keyword index, be sure to look under terms narrower, broader, or related to a particular topic. Although some of the keywords are not selected from a controlled vocabulary of terms, most of them have been selected from the DoD, DoE, NASA, or NTIS controlled vocabularies. The entries are arranged by keyword and then by the NTIS order number.

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Computation of Hankel Transforms Using the Fast-Fourier Transform Algorithm.
PB80-104045 33

Keyword term
Title
NTIS order number Page number

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New Jersey State Information Handbook: Formerly Utilized Sites Remedial Action Program.
DOE/OR/20769-T1 2086

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Induced Abortions Reported in Tennessee 1978.
HRP-0902677/4 1991

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BNL-28487 2006

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Reprint: Assessment of the Accuracy of Spectrophotometric Measurements and Methodologies.
PB81-149874 2072

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PB81-149833 2021

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High Resolution Vacuum Ultraviolet Spectroscopy of Small Molecules.
AD-A094 393/6 2013

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AD-A094 404/1 2014

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A Study of the Tolerance of ROK Air Force Personnel tc Gz Centrifugation--Translation.
AD-A094 202/9 2007

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Experimental Determination of the Suitability of Crystal Accelerometers for Shock Measurements,
AD-A950 135/4 2070

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PAT-APPL-6-203 938 2071

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AD-A094 388/6 2042

ACOUSTIC EQUIPMENT
Analysis of At-Sea Performance Prediction Systems.
AD-A094 234/2 2077

ACOUSTIC INSULATION
Noise Abating Sleeve.
PATENT-4 230 059 2093

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PB81-130999 2066

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AD-A094 147/6 2093

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Subsonic/Transonic Configuration Aerodynamics.
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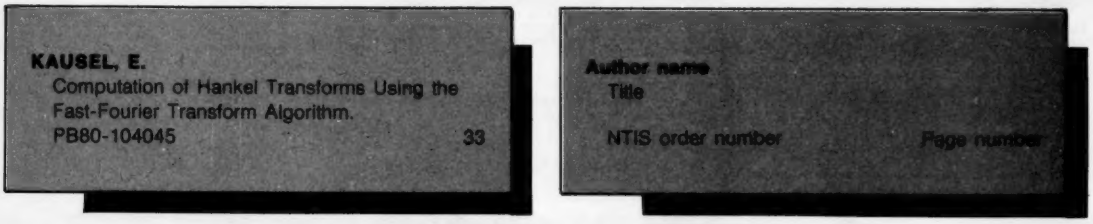

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